

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

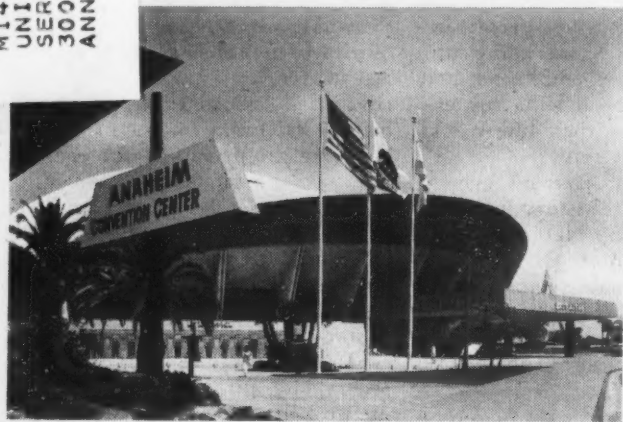
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Another Record-Setter



ANAHEIM, Calif. — The largest exhibit of computer equipment ever assembled in the U.S. — and probably the world — will open here next week as the 1978 National Computer Conference begins on June 5 for four days.

A record-setting audience of more than 40,000 is expected for the show.

A preview of events, the session schedule, exhibits and after-the-show attractions here and in the surrounding area begins after Page 54.

In the main exhibit area, 353 companies will be displaying equipment in 1,401 booths — an increase from the 317 companies displaying equipment in 1,140 booths at last year's up-until-now record-setting exhibit.

And in addition to the main exhibit in the convention center, another 110 companies will occupy 141 booths at the Personal Computing Festival that will run concurrently at the Disneyland Hotel here, boosting the total number of exhibitors to 463 in 1,542 booth spaces.

In the 107 sessions of the technical program area, the focus will be on computers and energy and other computer application areas, in addition to subjects ranging from artificial intelligence to computer crime and privacy.

A fee of \$75 entitles an attendee to four days of conference sessions, four days on the exhibit floor and a copy of the proceedings. For \$25, an attendee can get a one-day shot at the exhibit and attend any of that day's conference sessions or get a four-day admission ticket to the exhibit.

A one-day ticket to see the exhibits costs \$10. A ticket to the Personal Computing Festival costs \$9 for three days or \$5 for one day and can be applied to any of the NCC registration plans. Students get the whole package for \$10.

Churches Hit IBM Inaction On Rights in South Africa

By E. Drake Lundell Jr.

CW Staff

NEW YORK — IBM's policy of not selling computers for applications that abridge human rights is "hardly worth the paper it is written on," according to church-related groups protesting the use of computers in such applications.

At the same time, it appears that in at least one case IBM may be skirting — but not breaking — U.S. government regulations against the export of computer equipment or service to the military and police in South Africa.

Although the firm has stated in principle that it will not knowingly bid on equipment for repressive applications, "We're skeptical about how serious IBM is in applying those principles," Tim Smith of the Interfaith Center on Corporate Responsibility (ICCR) said here.

That skepticism was fed particularly by a meeting between church groups and IBM top management at which IBM management said it would continue to service computer systems installed in the South African Department of Defense.

In addition, *Computerworld* has learned that the Computer and Business Equipment Manufacturers Association (Cbema) — with IBM as the largest member — lobbied against adoption of regula-

tions that might have slowed IBM's "and other members' trade even before the ban was imposed.

The specific U.S. government regulation IBM may be skirting is a supplement to the Export Administration Regulations (No. 175) issued on Feb. 16. It was enacted to bring the U.S. in line with United Nations resolutions on trade with South Africa.

The regulation "imposes an embargo on exports and reexports of U.S.-origin commodities . . . for use by military or

police entities of the Republic of South Africa and Namibia" and was issued "in order to further U.S. foreign policy regarding the preservation of human rights," according to the Commerce Department.

The regulation also clearly states that "this includes the export and reexport of commodities and technical data to service equipment owned, controlled or used by or for" the police and/or military in South Africa.

Despite these regulations, (Continued on Page 4)

Communications Bill Ready for June Debut

By Ronald A. Frank

CW Staff

LAS VEGAS — A rewritten version of the Communications Act of 1934 will be introduced in Congress early this June by the House Subcommittee on Communications.

Word that a draft of the bill would be unveiled soon came from Harry Shooshan, chief counsel of the subcommittee, in a speech at the recent annual conference of the International Communications Association (ICA) here.

After the proposed legislation is introduced, hearings will probably begin in July, and it is expected that a final communications bill will be introduced in Congress sometime during January, Shooshan told the conference attendees.

Although he declined to discuss the specifics of the legislative proposal, the House counsel described it as being

"deregulatory" in nature.

During its 18 months of work on the bill, the subcommittee recognized that the Federal Communications Commission should be given "great discretion" and, at the same time, more direction, he said.

While ICA was meeting here, Rep. Lionel Van Deerlin (D-Calif.), chairman of the subcommittee, told a meeting of the American Electronics Association in Washington, D.C., that he personally favored including a provision in the revised act that would require AT&T to divest itself of Western Electric Co., its manufacturing subsidiary.

A subcommittee spokesman stressed that Van Deerlin was giving his personal views and, until the bill is unveiled in June, it will not be certain whether this requirement for divestiture will be favored (Continued on Page 6)

Input Chief Charged With Theft

By Brad Schultz

CW Staff

HAWTHORNE, Calif. — The computer input operations supervisor for the county welfare district office here has been charged with using the department's computer system to steal more than \$23,000 in public funds.

George Soto Vega allegedly fed false data to the Los Angeles County Department of Public Social Services (DPSS) computer system, causing the system to generate welfare checks payable to him and at least two accomplices.

Because of the embezzlement, the DPSS is beefing up its system security, converting to a new CPU and implementing a number of new security

procedures, a DPSS internal affairs source stated.

Vega allegedly sent checks totaling \$8,025 to himself, \$10,760 to another person and \$5,040 to a third person from January through March, according to Lt. Ed Alec of the Los Angeles district attorney's office. The checks were made out in amounts ranging from less than \$300 to \$585, Alec said. About \$13,000 of the missing funds have been recovered.

Vega's purported scheme involved manipulation of public assistance case data input at the Hawthorne DPSS district office. Public assistance cases originate at DPSS district offices, where relevant data is accumulated on cassette tapes

using Sycor, Inc. terminals. This data is then transmitted to a Honeywell Information (Continued on Page 6)

Canada Curbing All Foreign Labor

By Don Leavitt

CW Staff

OTTAWA — In a move to improve the employment possibilities for its own citizens, the Canadian government recently limited the ability of non-Canadians to accept even temporary work in this country without what may be a long waiting period.

Under the 1976 Immigration Act and related regulations, foreign workers must have government authorization be-

fore starting work here. This requirement applies no matter how short the proposed work; even a half-day effort by a non-Canadian, if paid for by a Canadian firm, would require a work permit, a spokeswoman noted.

Although many DP assignments are long-term and therefore subject to other rules, independent consultants, systems engineers and trainers typically work on short-term projects and their

activities could be sharply impacted by the new regulations.

Very sharply impacted indeed. Hank Calero, a lecturer for New York-based AMR International, for example, was within two hours of finishing a two-day seminar in Vancouver in early April shortly after the regulations went into effect. Immigration officials interrupted his presentation, questioned him and made him leave the country when he (Continued on Page 6)



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Act Termed 'Indiscretion'

Sleuth Gets Canadian Crime Data

By Brad Schultz
CW Staff

OTTAWA — Civilian employees of the Ottawa Police Department gave confidential criminal history information stored in the Canadian Police Information Centre (CPIC) network to a private investigation agency, the Ontario Police Commission (OPC) has found.

The agency — Universal Investigations Services Ltd. — was used by the Hudson's Bay Co., a Canadian department store chain, to screen applicants for "high-risk security jobs."

The CPIC network, similar to the U.S. Federal Bureau of Investigation's National Crime Information Center, is accessed by virtually all municipal police departments in Canada. The OPC oversees its use in Ontario.

No prosecutions are expected in this case. In the OPC's opinion, no municipal, provincial or federal laws were violated. OPC's chairman, Judge Tom Graham, called the affair simply an "indiscretion."

Local Matter

Since the action occurred at the municipal level, the Canadian federal privacy act was not violated. That law applies only to abuse of data managed by federal government institutions, a spokesman at the Canadian Ministry of Justice explained.

Hudson's Bay management did not know CPIC was used to screen its job applicants, according to the firm's general manager, Blair Bustard. The retail store chain ended its relationship with Universal when police inquiries began, he added.

A Universal spokesman said his firm will not discuss the matter with the press.

The Royal Canadian Mounted Police (RCMP) reportedly began an investigation on a tip from a Hudson's Bay security section employee. The employee, Rosemary Morgan, submitted

five fictitious names to Universal with the secret approval of the RCMP, according to one source.

The RCMP later found two of the false names in CPIC files used by the Ottawa police, the source said. Personnel had already started checking out those names on the network.

Morgan "abruptly quit" her position after the RCMP interest became known, according to another source.

Question of Intent

CPIC terminals are the responsibility of local chiefs of police, OPC's Graham stated, adding it is illegal for anyone to access the network without a

Workers in U.S. Agencies Would Have Met Worse Fate

WASHINGTON, D.C. — Civilian employees of the Ottawa Police Department who turned over criminal history information to a private investigation agency are going unpunished. If those employees had been working for a U.S. law enforcement agency, their fate would have been far different.

A U.S. law enforcement agency that gave criminal history information from the FBI's National Crime Information Center (NCIC) network to the private sector for job applicant screening purposes would be in violation of federal law, according to the director of the NCIC, Frank Buell.

Under U.S. Public Law 92-544, a law enforcement agency may only provide NCIC criminal histories to other government bodies, such as licensing agencies. However, even this is prohibited unless specifically authorized by a state statute, which must be approved by the U.S. Attorney General, Buell said.

In a sense, licensing agencies may operate as intermediaries for private firms or organizations by using their authorized NCIC access to inquire whether an individual is subject to arrest or an obvious security risk, Buell indicated. But a criminal history itself may not pass from the NCIC to the private sector via any intermediary whatsoever, he said.

Criminal histories derived from local sources are not subject to 92-544, although state laws do provide similar constraints, Buell noted. A municipal police department might provide a history to a local barber licensing agency without violating federal law, although such an action might well violate state law, he explained.

There are no criminal sanctions for an individual violating 92-544, but the enforcement agency for which that person worked would suffer disenfranchisement from NCIC services until he was removed, Buell said.

police chief's authorization.

The OPC concluded that certain persons did access CPIC without authorization but it found no grounds for prosecution. The parties involved mistakenly thought they were doing the right thing, Graham said.

The OPC review focused on the intent of the individuals involved. The commission found that no one was paid to transfer the information to Universal.

In such reviews, the question of intent and the relative significance of the data abused are critical to establishing culpability, the Ministry of Justice spokesman explained.

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his train of thought and he doesn't work as well. With ROSCOE, response time is very fast.

"The overall result has been that our productivity has increased, our programming effort is more efficient, and our work is of a higher quality — all because of ROSCOE. It's beautiful."



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U.S. Firms in South Africa Boast 'Affirmative Action'

PHILADELPHIA — When discussing business in South Africa, many companies note they are following a six-principle Affirmative Action program for their employees there.

The program, developed by the Rev. Leon Sullivan of the Zion Baptist Church here, is followed by IBM and NCR Corp. as well as by other computer industry firms which are among the 55 U.S. companies in the program — out of a total of 375 U.S. companies doing business in South Africa.

The problem with the six principles, according to Tim Smith of the Interfaith Center on Corporate Responsibility, is that while they do improve the lot of blacks and others employed by the firms doing business in South Africa, they "completely ignore" the larger issue of white minority domination in that country and a social system that allows that minority to keep the black majority in subjugation.

The six principles require the firms to prohibit segregation in eating and work facilities; institute equal and fair employment practices; pay equally; initiate training programs that will prepare blacks and other nonwhites for supervisory positions; increase the number of blacks in management positions; and try to improve the quality of employees' lives outside the work environment.

IBM, for example, has 100 black employees out of a work force of 1,100 in South Africa, Smith indicated, and better working conditions for them will have little effect in the country where 18.6 million blacks are ruled by 4.4 million whites.

Furthermore, the six principles "totally ignore" the question of to whom equipment is being sold and how it is being used, Smith said.

In the past, U.S.-based groups supporting the black liberation movement in South Africa have contended that computers are being used by apartheid supporters to "find automated solu-

tions (consistent with white control)" to take the pressure off the need for skilled workers so that South African business will not have to train and advance blacks they employ.

As early as late 1971, the American Committee on Africa charged that "computers can do more than any other technique to enable apartheid to survive; computer methods allow the economy to run with a minimum of skilled workers, methodically reducing the economic pressure that was beginning to force training and upgrading on the job for black workers."

Groups Attack IBM Inaction on Rights

(Continued from Page 1)

however, Smith said that during the meeting in April, IBM officials indicated they would continue to service the systems — reportedly a 360/40, a 370/145 and a 370/158 — the firm has installed in the South African Department of Defense.

Other reports in the British publication *Computer Weekly* quoted Jack Clarke, the head of IBM South Africa, as indicating that service would continue "on a restricted basis" using stocks built up in South Africa, despite the Carter Administration ban.

IBM last week officially confirmed that it would continue to service the computers installed in the South African Defense Department, but only from parts already on hand in that country. Further, no changes or upgrades in either hardware or software will be made.

IBM also said the computers in question were being used only for administrative purposes. In addition, the firm maintained it has no systems installed in South African law enforcement agencies and said it believes that none of its computers are being used in repressive applications.

Under the letter of the law, IBM's ac-

tions are legal, Commerce officials said last week, noting that U.S. companies can use parts that were in South Africa before the ban was imposed for such service.

Furthermore, Commerce noted that large multinational firms such as IBM could use parts of totally foreign origin to service their equipment installed at police and defense organizations in South Africa, despite the U.S. government ban.

Cbema Protest

Cbema protested the regulations before they were even issued.

That association's foreign trade director, Lloyd Kaufman, said the group sent a letter last December to Frank A. Weil, Commerce assistant secretary for industry and trade, protesting the possibilities of such relations.

Cbema — with a reported one-third of its budget made up of dues from IBM — said the Commerce Department should not pass any regulations on the servicing of computer and office equipment because of current lease arrangements some of Cbema's members have with the police and military of South Africa.

However, it appears IBM is the only mainframe computer producer affected by the ban since it is the only one with operational equipment in the South African military, according to a CW survey of manufacturers (See accompanying story).

In addition, Cbema told Commerce it was worried about "secondary" effects of such a ban on U.S. trade.

Such a ban, Cbema said, would show other potential customers in countries with human rights problems that the U.S. government might cut trade with them and would force them to turn to non-U.S. suppliers for computers and other equipment.

ICCR 'Gravely Disappointed'

In general, the ICCR — a consortium of national Protestant organizations and 150 local Catholic groups — and other organizations such as the American Committee on Africa are "gravely disappointed" in IBM's position with respect to such trade because the firm has not adopted any concrete regulations to govern it.

Even though Frank Cary, IBM chairman, promised at the 1977 stockholders' meeting to restrict trade for applications that violate human rights, there has been no formal implementation of this policy at IBM and no

sing possible new accounts in the country before signing orders.

NCR Corp. does have a 399 electronic accounting machine installed at the Armaments Board in South Africa, but said the question of service has not arisen.

Amdahl Corp. said it did not do business with South Africa, and Honeywell Information Systems, Inc. said it had no computers installed in South Africa at all, having stopped marketing there in 1976.

Both Burroughs Corp. and Univac also said they had no computers installed in military or police applications in that country.

guidelines given to managers for implementation, Smith noted.

One particular application the church groups see as repressive concerns the use of computers in population control.

One of the methods the South African government uses to enforce its apartheid laws is the pass system, which requires every black African to carry a 50-page identification document with information on age, sex, race, district in which he is permitted to live, ethnic group to which he belongs, educational status and so forth.

All of these dossiers on Black Africans are stored on an International Computers Ltd. CPU in a massive data base that is accessible throughout the country by police officials.

An IBM 360/50 is used as an extension of this system run by the South African Interior Department. It does not contain data on blacks in the country, but is used to store dossiers on "coloreds" (mixed-race people), "Asians" and "whites," Smith said and IBM confirmed.

"Clearly, in a police state we feel this is an aid to repression," Smith said, adding that IBM has chosen to view it as simply a census system.

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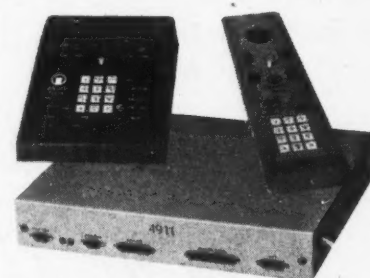
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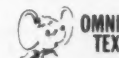
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No Policy Yet on Private Sector Carter Chided for Dragging Feet on Privacy

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — A U.S. House of Representatives subcommittee last week chided the Carter Administration for its failure to translate the Privacy Protection Study Commission's recommendations into policy statements and legislative proposals.

Those recommendations, issued last June, focus on privacy protection in the private sector.

"Legislative action has been stalled while waiting for an administrative policy" on this issue, Rep. Richardson Preyer (D-N.C.) told the Administration's representative during hearings here. Preyer, chairman of the House Subcommittee on Government Information and Individual Rights, added that recent months have seen "growing pressure on Congress to proceed without waiting for the Administration to develop its position on privacy."

Appearing before the subcommittee to explain President Carter's plans for developing a privacy position, C.L. Haslam, general counsel for the Department of Commerce, reported that a minimum of two months will pass before the White House has a proposed privacy stance in hand. The inter-agency task force set up by the President last December was to have distilled the Privacy Commission's 162 recommendations into policy and legislative proposals by May 31.

Carter personally received the privacy commission's eagerly awaited report last July [CW, July 18]. At that time, he promised Chairman David Linowes and the other commissioners that theirs was one report that would not be allowed to collect dust on federal shelves.

Complexity Blamed for Delay

The commerce general counsel assured the House subcommittee that the Carter Administration places the highest priority on privacy issues. Appearing on behalf of Commerce Secretary Juanita Kreps, who co-chairs the interagency privacy task force with Stuart E. Eizenstat, assistant to the President for domestic affairs and policy, and Assistant Commerce Secretary Designate Henry Geller, Haslam noted that privacy was selected as one of the first areas for study under Carter's new domestic policy review system.

The complexity of the subject matter — not staff turnover — has caused the delay in transmitting proposed administrative position to Carter, Haslam asserted. He said the approach taken to privacy by the President will follow the privacy commission's lead.

In addition, Haslam suggested the Office of Management and Budget (OMB) would be "a logical place" to house overall privacy responsibilities, but stressed that no decision to give OMB such authority has been made.

HEW View

After listening to Haslam and asking him whether Congress should wait any longer for the President to offer his legislative proposals, Preyer turned to executive branch witnesses from the Department of Health, Education and Welfare (HEW), who offered their views on bills dealing with medical records that are now before the legisla-

ture.

HEW has nearly completed draft legislation on medical record confidentiality and expects to send its proposed bill to Capitol Hill within three to four weeks, according to Richard Beattie, HEW deputy general counsel.

Beattie told the subcommittee that HEW's suggested legislation will also generally follow the recommendations made by the privacy commission. The department would have a medical records statute cover all institutions which desire to receive federal funding under Medicare and Medicaid programs.

Otherwise, HEW believes any law should initially be directed at hospi-

tals, skilled nursing facilities and intermediate care facilities. The privacy commission recommended that a law governing medical record confidentiality apply to a broader range of health care institutions, but HEW contends this is unnecessary.

Similarly, "while we might have the authority to extend privacy legislation to private physicians, such an action would be a major step for us in the absence of clear abuse," Beattie stated.

HEW would go beyond the privacy commission, however, in allowing researchers access to medical records. "We need to strike a balance between privacy protection and the administration of health care programs," Beattie

said. Biological information and data about epidemics isn't enough where studies of health care utilization and costs are at issue, he added.

The proposed HEW legislation would require researchers to be familiar with the laws governing medical record confidentiality.

HEW took issue again with the privacy commission by arguing the need to retain personal identifiers on medical records that find their way into research. There are times when researchers discover a need for follow-up information about care and treatment, making contact with former patients imperative, Beattie suggested.

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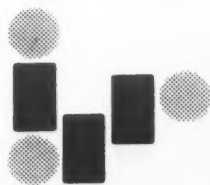
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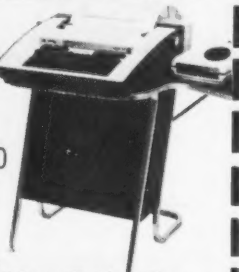
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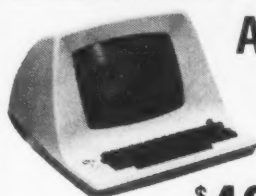
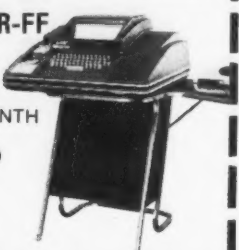
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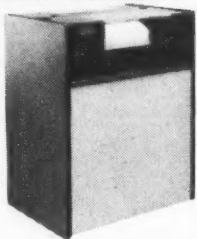
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Canada Seeks Foreign Labor Limits

(Continued from Page 1)

failed to produce the now necessary authorization.

AMR spokesmen in New York said last week that Calero's incident was the only one they knew of related to the new crackdown and added that since it happened, they have been trying to work with Canadian provisional and federal officials to avoid any repetition.

Getting Authorization

Obtaining a work permit — officially an "employment authorization" — is a four-step process. As the first step, a job offer from the foreign worker's prospective Canadian employer must be presented by the employer to the nearest Canada Manpower Centre, a local office of the government's nationwide employment service.

The manpower center then matches the job offer against files it has on unemployed Canadians or it advertises in newspapers for Canadian candidates for the job. If newspapers are used, this part of the process may take

three weeks or a month, the spokeswoman acknowledged.

If the center finds that no qualified Canadian resident is available to fill the job, however, the Canadian government office nearest the prospective job holder's home is notified. Only then will the prospective non-Canadian employee be called in for an interview and asked to complete an application (in duplicate) for an employment authorization.

The interview will determine if the worker qualifies for temporary entry under Canada's immigration law and if the worker is qualified for the job being offered. A pamphlet outlining the basic procedure leaves unexplained how the interviewer determines if the worker is qualified in any technical field such as DP.

A medical examination at the worker's expense may be required, the pamphlet added. In any case, if the worker's application is approved, he will receive a visa and an employment authorization to cover "the particular job for the period of time the employer

will need [his] services."

The pamphlet later reiterates that the work permit is issued only for a specific period of time. "If the authorized job is terminated or extended, the worker should contact the nearest Canada Immigration Centre without delay. All applications for an extension or a change in conditions must be made before the authorization expires," it warns.

Employees making temporary inter-company transfers from, for example, a U.S. corporate office to a Canadian affiliate, must apply for the employment authorization before they can go to work. In this situation, however, the manpower center certification step is waived and the process is quite automatic, the spokeswoman said.

Independent consultants are not exempt from the certification step, she stressed, even if they are being hired by a non-Canadian firm to do work here. Lecturers at public seminars, such as the AMR series, are also subject to the entire authorization process, she continued.

Input Chief Charged in Welfare Rip-Off

(Continued from Page 1)

Systems, Inc. 3200 CPU at the DPSS central facility.

DPSS internal investigators believe Vega created false information on the terminal equipment and transmitted it to the 3200, bypassing normal authorization procedures. This false information "reactivated" terminated welfare cases, sending payment checks to persons Vega is said to have specified, rather than the former recipients.

Vega allegedly caused documents confirming the cases he illegally reactivated to be sent to other districts, hoping in this way to conceal the embezzlement, according to Jim Wingman, chief of DPSS internal affairs. Confirmations are automatically generated by the 3200 each time a district changes the status of a case, he explained.

Rerouted Confirmations

According to investigators, Vega thought he was safe in sending the false confirmations to other district offices. His own office received no confirming documents on the illegally reactivated cases, and he disposed of the source documents created there, they said.

But the offices which received those confirmations could not match them with any of their own cases. Eventually DPSS internal affairs was apprised of the situation, and an investigation began that is still under way. Vega was discharged and a warrant for his arrest was issued soon afterward.

Vega has pleaded not guilty to 11 counts of theft of public funds and one count of grand larceny. He is currently awaiting trial.

To date, none of his alleged accomplices have been criminally charged in the matter.

As a result of the affair, which exposed a number of weak points in system security, the DPSS is replacing its HIS 3200 with a Univac 1100 CPU, according to Al Bague, a computer analyst assisting the DPSS internal investigation. The department is also replacing its Sycor input operation with

Univac UPS 400 terminals.

"Part of the new installation calls for automatic polling of districts, with district locations fixed so there is no transmission by a Sycor operator," Bague said. "Once you go to transmit, you can only transmit during a period when the central computer is polling a given district and already has the location all locked in."

The software also locks in points of

transmission, storing this information "permanently" on file, without the possibility of user override, he noted.

Confirmation documents are the only central documentation generated when a transaction is submitted. "There is no ongoing, permanent record of transmission inputs in raw form . . . and no retention of the pages showing the original data as transmitted," Bague said.

Communications Bill Ready

(Continued from Page 1)

by other members of the subcommittee and incorporated into the bill.

The lawmaker's remarks came during a question-and-answer session and were not part of his prepared comments. As such, the chairman was representing an opinion that may or may not be included in the legislation, the staff spokesman said.

Shooshan said that although White House sources have referred to the rewriting of the 1934 act as a "healthy exercise," the Administration has not released any statements with respect to where it stands on the bill itself.

In drafting the legislation, the House subcommittee has kept in close contact with its counterparts in the Senate.

One of the problems in introducing the measure in Congress is that lawmakers have relatively limited knowledge about the communications area, Shooshan said. Many members of Congress gave their name to the original Consumer Communications Reform Act without understanding what issues were involved, he said.

User Input Urged

Commenting on the change approved by ICA members at the conference to become more involved with regulatory issues, Shooshan said it was most important that users provide input and make their positions known to their representatives in Congress when the new bill is up for hearings.

The counsel told ICA members that two recent votes might have been re-

versed if users had spoken out on the issues. In one case, the post office wanted to experiment with electronic mail, but current laws prohibit anyone but the post office from supplying postal services. Because of this possible conflict, provisions for the post office to study electronic mail were deleted from the legislation.

In the second case, a satellite bill would have allowed users to deal directly with Comsat, which is classified as a carrier's carrier.

In both instances, at least some input from users might well have changed the course of the legislation, he said.

Asked if the soon-to-be-announced legislation has sidetracked the recommendations of the telephone industry task force, Shooshan said no, adding that a four-point program presenting the position of the telephone industry had recently been completed by the phone companies and this plan is now under subcommittee consideration.

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Central Software Standards Advised for DDP

By Howard A. Karten

CW Staff

NEW YORK — Retaining centralized control of software standards is an essential element in implementing a distributed data processing (DDP) system, according to Leo J. Cohen, president of Performance Development Corp. and keynote speaker at a recent Mid-Atlantic Computer Expo '78 session on critical decisions in DDP.

Cohen, the author of several technical works in the DP field, told the heavily attended session that electrical, or merely technical, connection of the elements in a network is a relatively minor point "now that there are \$14.95 chip processors." A more significant concern, he said, should be the creation of software and functional interface standards in one location in an organization. Setting these specifications centrally means they can be enforced locally, and an organization need not necessarily rely on only one vendor for equipment.

Noting that "DP history is largely a history of keeping designers and programmers happy and busy, while little has been heard, historically, from the end user," Cohen discussed how user departments should plan "from ground zero" to enter DDP.

The most important element in this planning, he said, is what he called a "requirement statement." The requirement statement should be created jointly with the user, through negotiation and consultation. It is important to realize, he said, that the end user thinks in non-DP terms.

To obtain the requirements statement, Cohen said he uses what he calls a service analysis, which he said is his term for systems analysis.

In discussing the use of the data with a client or end user, Cohen said he asks four things about the data: how frequently it will be used, how soon the user will need an answer after inputting data, what data elements must be

present in the data base to delivery service and what operations must be performed on the data in order to satisfy the [non-DP] client or user.

The answers to these questions, he said, give him some idea of the criteria for distribution.

The need for a strong network administrator comes about, Cohen said, because "someone's got to know where

it all is, how it's working, what adjustments should be made and so forth."

The primary role of the network administrator then becomes not hardware, software or training, but data administration. According to Cohen, this consists of finding out where the data is, preserving its quality and movement and seeing that it gets to those who need it.

Mini Selection Chaotic But Rewarding, User Says

By a CW Staff Writer

NEW YORK — Dealing with mini-computer vendors is more difficult, more suspect, more chaotic and more dynamic than dealing with mainframe vendors, but ultimately more rewarding. Although the risks are higher, the rewards are also bigger and far greater economies can be achieved.

These were some of the views shared by Matthew H. Dietz, Systems Manager for Marketing at the Schering Corp. in New Jersey, with attendees at the workshop in distributed data processing (DDP) at the Mid-Atlantic Computer Expo '78 here recently.

Dietz said selling his management on the idea of DDP was difficult, since it was — and is — committed to the idea of centralized DP.

Dietz, whose company moved directly from the use of time-sharing services to an in-house DDP system, drew heavily from his company's experience in DDP for his presentations. He suggested five criteria to use in deciding whether to replace an existing application with DDP:

- Whether on-line availability is needed in the application.
- Whether the equipment proposed for DDP use is adaptable to the existing physical environment.
- Whether it uses Basic.
- Whether it can be used by non-DP personnel.

• Whether the equipment is immediately available.

This last point is important, Dietz said, because vendors often try to sell equipment not actually available, but on the drawing board or production line.

The actual measurement criteria used to assess equipment can be divided into five areas, Dietz believes. These are hardware and software capabilities of the system, characteristics of the vendor itself and the costs and risks associated with the decision to convert.

Adaptability to the existing environment, the ability to support further growth and immediate availability are the most important hardware considerations, Dietz said, while the use of Basic and the ability of non-DPers to use the system are the most important software considerations.

Selection Process

Using his measurement criteria to assess the products offered by the vendors, Dietz said his company, a division of Schering-Plough Corp., found that the products being offered were so similar in capabilities and functions that it was necessary to assess the capabilities of the vendors themselves.

When his company selected Datapoint Corp., a strong factor influencing that decision was the fact that the company offered a "try before you buy" option for three months. That, he said, is the only way such a system can really be evaluated.

After bringing in the Datapoint equipment, Dietz assigned a full-time analyst to the marketing users. This was a significant factor in his success.

Looking back over his experience with the system, the manager said he found a number of surprises — some pleasant, some not so pleasant. On the pleasant side he said the level of service he received from the vendor was "excellent."

"I heard that [Datapoint's] idea of service was slowing up the delivery truck as it passed your company," he told the audience.

The unpleasant surprises, although they affected the company's original projection of savings, were not major.

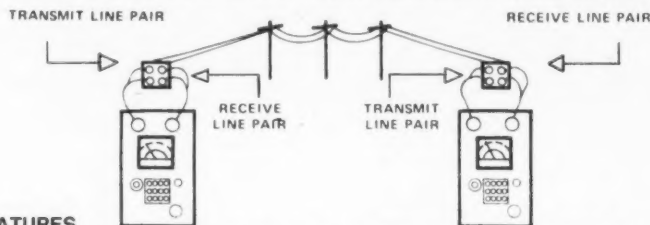
First, the air conditioning proved inadequate after the company cut back to save power during the energy crisis.

Second, to achieve its goals, the company needed a full Basic compiler instead of the free, stripped-down compiler offered with the equipment. The larger compiler meant the company could run only one partition in the machine instead of the two it had originally planned.

Dietz stressed that users have to learn from experience.

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First in New England Hartford Bank System Features Fedwire Link

By Brad Schultz
CW Staff

HARTFORD, Conn. — The Hartford National Bank and Trust Co. has installed an Automated Funds Transfer (AFT) system featuring a computer-to-computer funds transfer link with the Federal Reserve Bank of Boston (FRBB).

Other Federal Reserve Districts have similar links, but Hartford National's Federal Reserve Wire (Fedwire) interface is the first of its kind in New England. Financial Industry Systems (FIS) of Hartford is now marketing the Fedwire link program and the complete AFT package.

The AFT system was designed to streamline Hartford National's processing of large dollar transactions with correspondent banks and commercial customers. On an average day, the system executes 1,100 to 1,200 transactions representing \$800 million to \$1 billion, according to Chris Book, manager of the bank's money transfer department.

About 60% of this dollar volume is generated by customer activity and the other 40% by transit activity, Book said. Typical transit activity includes deposits and withdrawals applied to Hartford National's accounts with other banks, he explained, noting that individual transactions of \$25 million are not uncommon.

Examples of links similar to Hartford National's Fedwire interface that have been operating in other Federal Reserve districts include the link between FRB-New York and Irving Trust and the link between FRB-Cleveland and the Mellon Bank, Book said.

The AFT system controls all communications between Hartford National and the FRBB, FIS systems development officer Bingham W. Higgins said.

The system is said to manage security by assigning protocols. It reportedly routes each message to the correct files; generates each day's settlement, audit and management reports; and processes all transactions in real time.

The system also features an interface with the Bankwire administrative network, which handles transactions and transmits messages among a number of large banks, Higgins added.

'All-Electronic' Environment

Book said the system has enabled his department to shift from an "all-paper" to an "all-electronic" environment, yielding better access to information for customer service and internal research.

Describing the system's benefits, Book said that "funds are available faster for use by the customer. In addition, documents needed to ensure that funds transfers are out the same day are produced automatically, on-line.

"Demand deposit accounts are updated instantly, on-line, and business growth has been efficiently absorbed. Administrative productivity has also been improved, enabling personnel to do more and better work. Over the past year, business volume has doubled, but there has been no increase in staff," he continued.

"Errors are caught [on video display] and corrected promptly at the data entry point [via text editing]. When an error is made, the error alone is cor-

rected without repeating the transaction," Book added.

The Fedwire interface allows communication between Hartford National's IBM 370/158 and the FRBB's Federal Reserve Communications System (FRCS).

This link employs the Basic Telecommunications Access Method (Btam), supported by IBM's CICS and OS/MVS Release 1.3, and it complies with the 1975 FRCS Computer Link Implementation Guidelines for First District Member Banks, Higgins stated.

The Fedwire interface is integrated with the rest of the AFT system via certain facilities of CICS, including temporary storage, transient data

queuing and automatic task initiation, Higgins said, indicating that the interface module can thus operate asynchronously with the other processed transactions. IBM's Vsam is used for primary file storage, he added.

Message Transmission

Funds transfer messages are transmitted to and from FRBB at 2,400 bit/sec via leased communications lines. Book's department uses eight IBM 3270 CRT terminals and two IBM 3284/2 printers, he noted.

The AFT system interfaces Bankwire via an Incoterm Corp. STD 325/2 CRT terminal with a Digital Equipment Corp. PDP-75 punched paper

tape output device modified to emulate an IBM 3275, with the punch operating as if the CRT terminal were connected to a 3284 printer, Higgins said.

The system consists of basic modules whose functions are Fedwire processing, pending and history storage, statement rendering, and "due from bank" processing, he continued, adding that all modules except Fedwire are written in ANS Cobol.

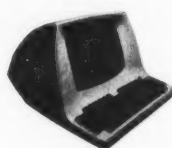
FIS developed AFT in conjunction with Hartford National as a pilot project, Book indicated, explaining that FIS regularly manages the bank's DP department and could thus take advantage of a normally close working relationship.

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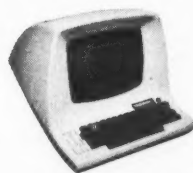
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System Helps Manage County Road Repair

By Tim Scannell

CW Staff

PONTIAC, Mich. — Potholes and damaged highways are the enemy and DP is the protagonist as the Oakland County authorities here fight to maintain its system of roadways.

Since 1969, the Oakland County Road Commission has been using a

computerized management system in this battle to help get more funds allocated for road repair and less for administrative purposes, according to John R. Gnau Jr., chairman of the commission's board. "The system realized a cost savings of \$489,000 in the first three years of operation while making possible comparable levels of

maintenance work," Gnau said. "We've been able to produce at least 10% more work for the dollars available."

The system was initially developed and set up by the consulting firm of Roy Jorgensen Associates, Inc. of Gaithersburg, Md., but has since been customized to meet the specific needs

and conditions of the Oakland County area, Robert Steeger, maintenance operations engineer, explained. As a matter of fact, the consulting firm tends to frown upon the use of its name in referring to the system because "every client that it has worked with now has a program that's adapted to its needs and people ought to be describing their systems as their own rather than Jorgensen's," Steeger said.

The principles around which the system is built are those used in virtually any industry, Steeger continued. There are series of programs and subprograms that handle planning, budgeting, inventory, work loads, priorities and other factors important to an efficient operation, he noted.

Road, Activity Records

Basically, "we have an inventory of every maintainable feature on the road system . . . and a list of work activities," Steeger explained. "Each activity requires a certain crew size and a certain complement of equipment and materials." All of this information is fed into the computer, correlated and used by the maintenance supervisors to decide when and where pothole patching, road grading and similar tasks will be done, Steeger stated.

"Say we have 100 miles of road that is going to be pothole patched," he said. "Based on our experience and our own objectives for the year, we may decide to budget at a level of 4 tons of 'coldmix' per mile. This would generate a program of 400 tons for the year."

Supervisors also know from experience that it takes a three-man crew for pothole patching and that they use about 4 tons per day, Steeger said. This would give the commission about 100 crew-days or 300 man-days to allocate throughout the whole year.

The system totals work activities for the entire year, spreads them out on a month-by-month basis and, taking into consideration the budget restrictions, "informs us as to what level we ought to be staffing and utilizing materials for a particular district," Steeger noted.

Of course, the commission makes adjustments in its figures during the year to handle unforeseen conditions, more severe or less severe than it had anticipated on an average yearly basis, he said.

The majority of the maintenance programs for the Oakland County commission were formerly run in a batch time-sharing mode by a service bureau located at American University in Washington, D.C. However, the commission has recently finished converting the operation to run on its own Burroughs Corp. 2700, Gnau said.

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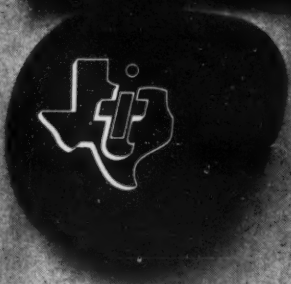
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Welfare Parents Bucking SSN Tags for Children

By Marguerite Zientara
CW Staff

BOSTON — A group of Massachusetts welfare parents are foregoing their welfare benefits rather than submit to the Social Security numbering of their children for DP recordkeeping.

Since January 1975, the Welfare Enumeration Project of the U.S. Department of Health, Education and Welfare (HEW) has required all recipients of Aid to Families with Dependent Children (AFDC), including the children themselves, to obtain Social Security numbers (SSN) in order to receive benefits. It was HEW that interpreted the law, passed in December 1975, to include children in the definition of "recipient."

To oppose the project in Massachusetts, a group of parents has formed the Welfare Enumeration Emancipation Program (Weep), a statewide organization with about 35 active members. Weep has a class action suit pending in U.S. District Court to stop the project on a number of legal grounds.

The suit, filed in June 1977, charges that the SSN regulation is an invasion of the privacy of those involved in the program, according to Michael Avery, Massachusetts Civil Liberties Union lawyer. "This could be a step toward requiring everybody to have a unique identifying number. Since it is probably easier to prey on poor people than on anyone else, the danger is that [the government] may first make poor people,

then gradually everyone, assume a unique identifier," Avery asserted.

Avery said the information is computerized but those opposing the enumeration project are still trying to determine to what extent it is computerized and to what uses the information is put. "No single, articulate and satisfactory reason has been given" for the existence of the program by HEW or the State Welfare Department, Avery said.

According to Steve Kane, Assistant Commissioner of Assistance Payments for the State Public Welfare Department, the program arose out of "congressional needs to avoid errors, to avoid duplicate cases and to have a unique identifier for AFDC recipients.

The unique identifier is needed so they can match files and find out if children are receiving Social Security Title 2 survivors' benefits, in addition to AFDC," Kane explained.

'Phony Issue'

Avery, however, sees the matter of welfare fraud as a "completely phony issue." He declared, "I think the total amount of money that goes for welfare fraud in this country is probably less than the amount of money one major corporation writes off on martini lunches in the course of a month. It is easier for people to get concerned if they can blame the issue on poor people."

Even though the national law requiring the SSN for AFDC benefits went into effect in 1975, Massachusetts did not require the SSN until February 1977 because "the State Welfare Department says it somehow postponed it," according to Jacqueline Dittich, one of Weep's founders. When the program was first started, she said, appeals were heard and denied from February through May of 1977, and only since January of this year have recipients' checks stopped.

"Part of the problem," Dittich said, "is that social workers are informing recipients that if they appeal, it's a useless way of objecting to the program because appeals are routinely denied. On the other hand, the State Welfare Department is telling us we need to make more noise by filing appeals in order to stop the program."

Support for Weep

Besides backing from the Massachusetts Civil Liberties Union, Weep is receiving support from the Massachusetts Law Reform Institute and Legal Services of Cape Cod and the Islands. Earlier this year, State Rep. Tom Lynch filed a resolution, still pending, to put a moratorium on the enumeration project until the federal court rules on the class action suit.

According to Tony Winsor, Massachusetts Law Reform Institute lawyer, there is a state statute under which a person can appeal such matters through an administrative hearing "which you lose and then go to Superior Court." Winsor continued, "We don't understand why they're requiring a lot of legal, mental and other effort by people in order to do the gracious thing pending resolution of these matters." He added that the legal appeal process could take "anywhere from a few months to a few years."

Similar suits have been filed in Minnesota, Vermont and New Jersey. Minnesota and Vermont ruled in favor of the recipients; New Jersey ruled in favor of HEW. All the cases are now under appeal.

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Charged With Submitting False Claims

DP Training School Owner on Trial for Fraud

By Marguerite Zientara
CW Staff

DETROIT — The owner of a computer training school has gone on trial here on four counts of fraudulently obtaining federal funds.

The government has already won a civil suit against the school — the Institute of Computer Technology (ICT) in suburban Oak Park — charging it with submitting false claims under a program to enable welfare recipients to receive training.

And now the school's owner, Harry M. Borcharding, is facing criminal charges for the same conduct. Borcharding and the school allegedly submitted \$389,103 in fraudulent claims under the Basic Educational Opportunity Grant (BEOG) program, according to the indictments handed down by the grand jury here and the earlier civil action.

The basic charges of fraud involve the allegation that the school had less than 24 hours of classroom time per week for students enrolled in the programs, but this was only discovered after the school apparently tried to boost enrollment through the use of computer-generated forms and pressure selling techniques at the local welfare office.

Under the BEOG program, a student seeking vocational training after high school can apply to the federal government for a grant, which he then takes to a participating school. The school, in turn, enrolls the student and submits his grant form to the government for cash.

Blank Applications

Several months after ICT gained approval to participate in the program in 1972, Borcharding approached the Wayne County Department of Social Services with a proposal to recruit 3,000 public assistance recipients for ICT training as DP specialists, according to Delois Whitaker, employment and training program specialist for the Social Services Department. Borcharding asked the department to sign up applicants from among the department's clients, which it agreed to do.

Social Services workers, however, became concerned when they received computer-generated applications which were blank except where information had been preprinted in three areas, Whitaker said.

In the space for the student's home address, the school's name and address had been printed and the answer "yes" preprinted in reply to a query on whether the student was a U.S. citizen. "No" was preprinted as the answer to whether the student had had prior training, Whitaker said.

Borcharding indicated that since these were the answers required for eligibility, it would save time if they were filled in, according to Whitaker.

The department did agree finally to help recruit as close to 1,000 applicants as possible, but "we were not pressuring anybody, we asked them to complete [the form] only if they were interested in computer science," Whitaker said.

Only eighteen applicants were recruited and, when the March 15, 1975 deadline for BEOG forms was near, Borcharding sent the Department a let-

ter saying that there was an "urgent need to get more [applicants]," according to Whitaker.

Accordingly, Borcharding got clearance from the department to send a team of recruiters to the Social Services Department's offices, where they recruited 3,300 applicants in about eight days' time, Whitaker said. "People in the office indicated [the team of recruiters] was not doing a thorough job of interviewing and were just signing people up," she said.

Contractor Refuses

After weeding out duplications obtained in those eight days, the school sent about 2,000 grant applications to

the government contractor hired to process them, the American College Testing Program in Iowa City, Iowa. Since they were delivered the day before the deadline and did not contain prospective students' home addresses, the contractor refused to process them, according to court testimony.

Because of suspicion in the U.S. Office of Education concerning the school's irregular applications, federal auditors conducted a survey of ICT from May 12, 1975 until the beginning of September 1975. Their findings were the basis of the criminal case filed last January charging Borcharding with four counts of "false, fictitious and fraudulent" statements, according

to Harold Gurewitz, U.S. attorney in the federal District court.

The indictments charged Borcharding with falsifying attendance sheets and computer printouts indicating the number of hours per week that certain DP classes were held. They charged that Borcharding said the classes met five hours a day, five days a week for four weeks, when "in truth" they met less than 24 hours a week, Gurewitz said.

Throughout the case, Borcharding has maintained his innocence.

No judgment has been made on last fall's civil trial verdict against ICT, on which the government could be awarded a total of \$786,206.

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Federal Aid Form Seen as Billion-Dollar Saver

By Edith Holmes

CW Staff

WASHINGTON, D.C. — The human resources team of the President's DP reorganization project believes a single application form for a variety of human services along with computer-assisted determination of an individual's eligibility will save the federal government billions of dollars annually. Such a system would also save millions of Americans much frustration in their dealings with the nation's multitude of welfare and benefit programs.

In its recently issued report [CW, May 22], the reorganization team described the present means by which welfare and benefit aid is obtained with the following scenario: A widow

living in an apartment with her three children and her invalid mother loses her job. Her savings run out and she believes herself eligible for some type of welfare, but she has no understanding of the government programs available.

Current System

Under today's delivery system, this woman would have to apply for federally funded human services at several different offices in various parts of her community. She would have to fill out many forms for such programs as Supplemental Security Income, food stamps, Aid to Families with Dependent Children and Medicare.

Each one of these programs has its own eligibility criteria and normally,

its own administration. The woman, who may be eligible for several of these services, must provide her own transportation to and from each program office.

Once at an office, she must wade through lines, forms and the determination of her eligibility for a service. "The staffs of the several program offices must review every item of information provided by the client, verify numerous items and calculate whether the client is eligible for the service applied for," the reorganization team pointed out.

"This process is lengthy, time-consuming, often results in errors and is satisfactory to neither the agency nor the client," the team concluded.

Under the team's preferred scenario,

the same woman telephones or walks to a nearby public assistance office and explains her situation to a professional social worker. The social worker invites her to sit down and punches a few keys on a terminal keyboard.

Questions begin to appear on the CRT and can be read by the woman and the social worker at the same time. Together they answer the questions; the social worker enters the answers into the system. The questions deal with total income, household expenses, residence and so on.

After approximately eight to 10 minutes, the questions are completed and the social worker requests a display of the programs for which the woman could be eligible. The CRT response is instantaneous and states that the woman is eligible for five human services programs if the information she provided is correct.

The woman is then supplied with a printout describing each of these programs.

Printout of Forms

Another button on the keyboard pushed by the social worker results in a printout of the forms the woman will need to complete to apply for those programs.

Finally, the system lists the verification items the woman must present to the public assistance office to verify her eligibility. These items include copies of birth certificates, check stubs from wages and rent receipts.

The social worker asks the woman to complete the forms at home and, together with the verification items, return them in person or through the mail.

If the application were conducted by telephone, the program descriptions, forms and list of items to be verified would be mailed to the client.

Only 20 Minutes

This entire process would take 20 minutes and the woman's tentative eligibility for the five programs would be determined with 99% accuracy, according to the reorganization team. All that would remain would be for one office to check the validity of the verification items when they arrive later. If the client could provide them within a few hours, service to her can begin on the same day she applies.

"If this scenario were a reality today, the federal government would be saving billions of dollars annually, and many of the client interface problems identified . . . would be nonexistent," the human resources team stated.

The team is convinced this scenario is not only possible right now, it is essentially taking place on a pilot basis in such states as Wisconsin and South Dakota.



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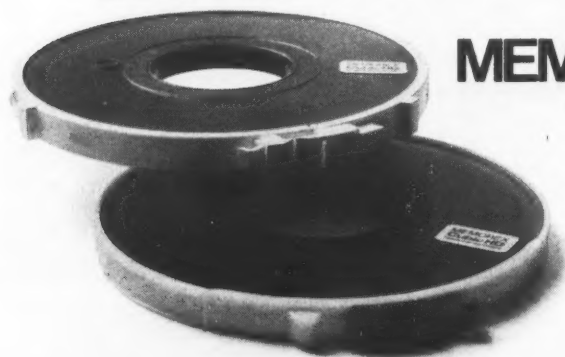
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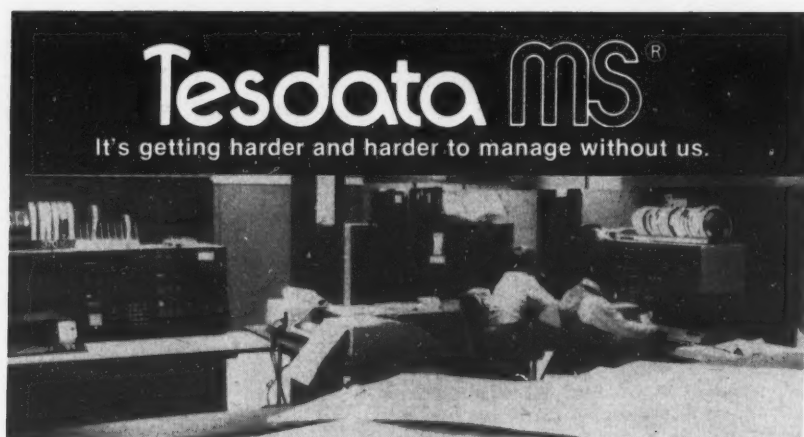
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IN DEPTH IN DEPTH IN DEPTH IN DEPTH

IN DEPTH

Data Base Systems: Design, Implementation And Management, Part II

By Ronald G. Ross

For a user interested in acquiring data management software, two distinct questions arise in the evaluation of commercial DBMS, neither of which lends itself to an easy answer. The first question has to do with what should be considered in selecting a DBMS.

A fully justified answer to this question presupposes a comprehensive determination of needs, a consideration of the alternatives and an investigation of the impact of DBMS on the organization. Only after these topics have been explored should the second question be addressed — but only if DBMS are still perceived to be a viable alternative in solving organizational needs.

This second question asks how the DBMS on the market today are to be properly evaluated. Answering this question, of course, involves establishing contact with DBMS vendors, who will supply additional data base information. This information is naturally slanted to their own products.

Too many organizations have allowed vendors to answer Question No. 1 as well as Question No. 2. An organization is well advised to remain within the framework of a two-stage evaluation, in which vendors address only question No. 2.

In surveying the DBMS on the market, there is no definitive answer to the question of which system is best. All have their merits, and all have shortcomings. Which is best really depends on the specific needs of a given organization.

Considerations in Selecting a DBMS

There are two alternatives to DBMS, given the need to upgrade data services. The first is enhancing existing in-house software; the second is purchasing a data management system (DMS), a less complex version of DBMS. Opting for either of these alternatives over DBMS indicates that organizational data needs, including needs projected for the future, do not require the data structuring and management services offered by a DBMS.

How are these data needs to be determined? There are general guidelines that can be followed; these aim at pin-

	Change File Descr.	Change Logic	Compile	Test	Man- Months
Programs using new data elements:					
Traditional:	Yes	Yes	Yes	Yes	1.00
Data Base:	No	Yes	Yes	Yes	.95
Programs not using new data elements:					
Traditional:	Yes	No	Yes	No	1.25
Data Base:	No	No	No	No	0.00
Other modifications:					
Traditional: write update program, test and document.					.75
Data Base: change data base description; reload data base; document.					.50
Total man-months:					
Traditional:					3.00
Data Base:					1.45

Figure 1: Man-months for changeover under traditional and DBMS approach. This illustration assumes a DBMS with data element level independence. Without this, the data base programs not using the new data element would probably have to be recompiled in order to accommodate a new record description. This would not be the case if the new data element were placed in a record by itself or in one that was not used.

pointing significant deficiencies in current data management.

The problem most often cited is the extensive duplication of identical data within two or more existing master files. DBMS have facilities for reducing these redundant data, consequently streamlining data access and improving update procedures.

A second common problem in data management is the need for extensive record sorting to produce high-volume reports. Again, DBMS have facilities that provide more direct access to individual data.

Another guideline, less tangible perhaps than the first two, is difficulty in implementing changes to record descriptions because of the need for extensive program modification and re-compilation; a case study that illustrates this problem follows. Data independence, sometimes overplayed as a DBMS virtue, does in fact mean significant savings in this type of program maintenance.

A large public organization employs approximately 25,000 people in various capacities. The DP department is responsible for maintaining the payroll/personnel system, which has been automated for some time.

The personnel master file is created and maintained using Cobol file descriptions. Approximately 80 active programs (about 40% of the total for the entire system) process this file.

In July 1977, at the end of the fiscal year, it was decided that a new data element was needed in this file, although the same element already existed in the payroll master file. The new data element added 35 bytes to the length of the personnel file.

Each of the 80 programs processing this file had to be recompiled to accommodate the new data element, even though only 10 of these programs actually used it in their respective processing tasks. Logic changes in these 10 programs were relatively straightforward, but some retesting was required.

An especially troublesome matter was updating the new data element. Established procedures existed to update the data element in the payroll file, but these could not be applied directly to the personnel master file. It was decided that a special program was to be written that copied update transactions from the payroll system to the personnel system. After some minor editing, these transactions could be applied to the personnel master file.

This new program was to be run periodically, depending on the processing load in the payroll/personnel system. The actual time lag in updating the personnel master file turned out to be a week or, in some cases, even more.

On several occasions users complained that they could not use the reports they were receiving because of discrepancies in control totals and other information. This problem was partially resolved by running the program nightly.

A post-project study showed approximately three man-months' effort had been required to effect the changeover. This manpower investment came at a critical time because of year-end processing in several departments in the organization, including the budget area.

During this period there was noticeable strain on computer resources, which revealed itself most clearly in prolonged turnaround. A number of people felt that the change had not been worth its cost in implementation.

Figure 1 outlines the manpower savings that would have accrued had the payroll/personnel system been implemented under a DBMS. This analysis reveals a saving of approximately 50% to effect the changeover in a data base environment.

Other benefits would have resulted in the following areas:

- Reduction in storage of approximately 775,000 bytes ([35 bytes - 4 bytes for pointers] x 25,000 records).
- Savings in compile time for programs not using the new data elements (see Figure 1).
- Uniformity in update; a payroll update renders the data element immediate.

(Continued on Page 18)

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Traditional Organization	Data Base Organization	Benefits
Each application typically has its own master file, which contains data duplicated in files of related systems.	The DBMS creates and maintains interfile access paths automatically so that the same data may be used by multiple applications.	Reduce general data redundancy across application files.
Each physical file containing the data to be updated must be processed separately. This is usually done at different times, causing discrepancies in various reports.	A program updates data in a single shared data base. The new data are immediately available for all applications.	Reduce the programming effort required for file updating.
Changes in record definition or expansion of record sizes must be reflected in every program accessing the data.	Data description is segregated from application programs. Only those programs actually referring to the changed data type need be modified.	Reduce the program modification brought about by changes in data definition.
Most traditional file systems support a single access path so that additional retrieval requirements must be satisfied by search and sort procedures.	DBMS provide automatic generation and maintenance of interfile linkage and indexes, which allows tailoring of access to meet the requirements of application systems.	Increase the accessibility of data by providing multiple access paths and retrieval sequences.
Application programmers often supply their own data names.	For many access operations, the applications programmer must use names known to the DBMS. Central data definitions are often maintained in a data dictionary system.	Encourage the use of standardized data-naming conventions.
Coding of security systems is an independent task. Such systems are difficult to implement, especially in COBOL.	Control blocks are generated that specify which data elements an individual application program can access. Control information and undesigned data are not available to the program.	Provide data security.
No automatic facility is provided; therefore, each application system must program its own recovery procedures. Standardized recovery procedures are difficult to define and implement.	Recoverability is an automatic feature of DBMS. Once processing errors are detected, the system can restore the data base files to the last intact file copy. All transactions against the data base are logged on tape, from which quick file restoration is possible.	Provide recoverability.
Tape handling is a major activity in production runs.	Data base files reside on disk.	Reduce operator intervention and associated production errors.
Application systems and data communications are sometimes difficult to integrate within acceptable standards of performance.	Most DBMS have integrated or interfaced teleprocessing monitors.	Promote data communications services.

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Figure 2: The benefits associated with data base organization, compared with traditional organization.

(Continued from Page 17)

ately current to the personnel system.

There are other guidelines, too numerous to discuss individually, for determining data needs and the advisability of selecting a DBMS. A useful exercise at this point is to consider the advantages of DBMS (Figure 2) in an examination of current conditions in the organization.

This exercise may or may not reveal facts of considerable interest; in either case its purpose is served. Investment of several man-months and careful documentation of the results are recommended.

The alternatives to DBMS, as men-

tioned are enhancement of in-house software and acquisition of a DMS. It is generally accepted that it is unwise to attempt development of in-house software that matches the capabilities of DBMS.

This consensus is based on the extent of costs for both initial investment and continuing support. It is no small item that the vendor is responsible for maintaining DBMS software.

Although in-house I/O modules and data managers are by no means a thing of the past, there is some feeling, well justified by experience, that these types of projects are not for any but the best (and best funded) DP depart-

ment.

Projects of less than DBMS scope must of course be judged on individual merit. An additional consideration, however, is the delay in implementation time of in-house projects; DBMS (and DMS) packages are "up" rather quickly — and at a relatively fixed cost.

Attractive Option

DMS may be an attractive alternative for some organizations, especially where organizational needs fall somewhat below the capabilities provided by DBMS. Generally, DMS do provide a degree of data independence, again with the advantage of vendor-supported software, but do not attempt to lessen data redundancy or streamline data access on a large scale.

As a rule, DMS concentrate on improved data access from a single file for a single, although not necessarily small, application. Improved data access is especially defined as optimization of report generation.

DBMS, on the other hand, are oriented toward support of more than one application by the interrelation of multiple files. Improved data access is defined more broadly, especially as it refers to telecommunications.

Both types of systems — DMS and DBMS — generally support high-level search capabilities, which are somewhat more restricted in DMS because of the limitations in file structuring.

DMS vendors claim their systems can significantly reduce the implementation time of application systems. This claim has substantial justification in fact. Some DMS packages — for example, Mark IV from Informatics, Inc. and Ramis from Mathematica, Inc. — are very popular and may indeed be a viable alternative for some organizations. In investigating these systems it is important to keep in mind the distinctions between DMS and DBMS, which tend to be obscured by vendor terminology.

Avoiding a Nightmare

If either of the alternatives to DBMS — a DMS or software enhancement — proves to be entirely sufficient to meet organizational needs, there is no need to continue with the selection analysis. If not, important considerations remain before the actual selection of a DBMS. Experience with data base systems shows that these considerations are often underrated or neglected at great future cost.

The impact of a DBMS on an organization is disruptive. The technology of DBMS is new and difficult and requires substantial investment in training. More than this, the data base approach cuts across traditional installation management and requires staff reorganization and hiring.

The transition to a data base system is highly visible, in particular because users outside the DP department are inevitably involved in the reshaping of data needs and goals.

In fact, although the majority of nightmare tales about DBMS are not actually true, there are a number of areas in DBMS design and application that present problems too significant to overlook. A list of these problem areas is presented here:

Operations

1. Data base management systems often require a great deal of overhead in hardware and software resources, not only during implementation but on a continuing basis.

2. Production is often disrupted during conversion to the data base system.

3. DBMS operation costs, especially the costs associated with periodic reorganization of data base files, can be deceptive and thus reduce efficient resource allocation.

4. Some DBMS have inadequate or difficult restart capabilities and system crash protection.

5. Most DBMS do not report adequate statistics on internal data structuring status.

Programming

1. Installation and maintenance of the data base system requires a continuing investment of professional resources that may retard other project development.

2. DBMS require conversion programs for transferring data from existing files to data base format.

3. Increased dependence on an externally supplied DBMS package may decrease the organization's ability to rely on in-house personnel for system support.

4. Some DBMS have undesirable restrictions in data handling and cumbersome interface standards.

5. Some DBMS lack an effective query language and/or generalized report feature.

Personnel

1. Sufficient education of personnel in data base use is expensive and time-consuming.

2. It may prove difficult to acquire and keep qualified personnel, especially people knowledgeable of a particular system.

3. The implementation of data base systems disrupts established organizational patterns and precipitates a degree of organizational stress.

Service

1. Some DBMS have inadequate capabilities for preventing unauthorized access to data. This problem is made more significant by the centralization of data base files.

2. Because of this centralization, loss of data base files may have even worse implications for service than a corresponding loss in traditional application files.

3. Unless they are properly structured and maintained, the data collected in the data base may appear in-

IN DEPTH

ertial to users and programmers alike.
4. System reorganization requires periodic downtime.

Future Development

1. DBMS tend to cause lock-in to a particular format and system, which may restrict choices among new software and/or hardware.
2. The inappropriate application of DBMS capabilities may cause performance degradation over a period extending well into the future.

The impact of most of these problems can be minimized by careful implementation of the data base system. This implementation requires a significant investment of time and money, but considerable payoff can be expected in the long run.

There is, of course, substantial opportunity for improved data service in changing to a DBMS, provided the change is properly managed. Even so, full analysis of projected changes beforehand is wise.

In summary, a DBMS package selected and purchased is not a data base system up and running. The commit-

ment required to reach this goal is so substantial that it alone should deter those who have not already decided that a DBMS is the best, or perhaps the only, solution to data needs.

Evaluation of Current DBMS

None of the DBMS on the market has distinguished itself as preeminent. Each system is designed for maximum benefits in some, but not all, areas. In fact, there are major differences even in the approach to data management itself, the most obvious cleavage being between physical linkage and data inversion.

A further complicating fact is that the operational characteristics of a given system depend not only on the hardware configuration of an installation, but also on the nature of the organization's application data. By its very design, a DBMS is extremely data-dependent in performance.

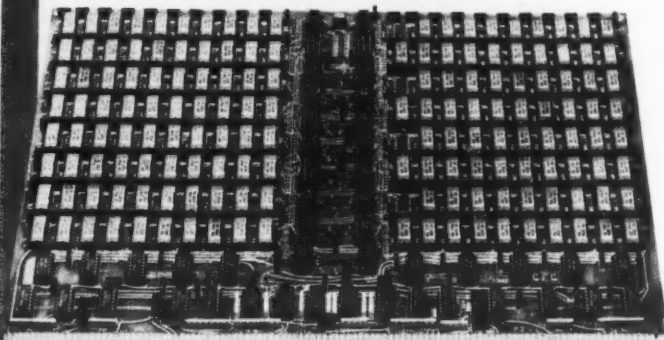
This does not imply that any current system falls below minimum standards in basic data handling; rather, it means that each installation has a unique set of application circumstances that must

(Continued on Page 20)

Hardware	DBMS
IBM 360/370	IMS TOTAL IDMS SYSTEM 2000 ADABAS Model 204 DATACOM/DB INQUIRE NOMAD*
Burroughs 6700/7700	DMS-II
Burroughs 1700	DMS-II
UNIVAC 1100 Series	DMS 1100 SYSTEM 2000
UNIVAC Series 90	DMS/90
UNIVAC Series 70	DMS/90 TOTAL
Honeywell Series 600, 6000, 60 Level 66	I-D-S/II (I) TOTAL
Honeywell Series 200 and 2000	TOTAL
Digital DECsystem-10, DECsystem-20	DBMS-10 MAGNUM*
CDC 6000/Cyber 70, 170	SYSTEM 2000 TOTAL DMS-170
Sigma 5/6/7/9 (H.I.S.)	EDMS
NCR Century Series, Criterion Series	TOTAL
* Remote computing only.	

Figure 3: DBMS classified by mainframe hardware family.

RAM-STOR 8000
MEMORY FOR
CRITERION
COMPUTERS



NAME _____
TITLE _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____
PHONE _____
☐ Urgent! Please phone me, ext. _____
☐ Have your Rep contact me
☐ I want a demonstration ☐ Send me literature

For further information call or write:

COMPUTER ENHANCEMENT CORPORATION
3189-E AIRWAY AVENUE
COSTA MESA, CALIFORNIA 92626
714 754-0521

Word Processing

on your

Hewlett-Packard
Computer

CCS
CORPORATE COMPUTER SYSTEMS

72 Lenox Rd.,
Wayne, New Jersey 07470

Telephone
(201) 256-5488

IN DEPTH

(Continued from Page 19)

be taken into account when selecting the best DBMS package.

Hardware systems, of course, immediately restrict choices among DBMS, especially for the non-IBM user. Figure 3 classifies DBMS by hardware.

One of the more interesting recent developments in the data base field has been the cross-mainframe implementation of several DBMS, most notably Total by Cincom Systems, Inc. and System 2000 by MRI Systems Corp.

Another interesting development that may prove very significant for the systems of the future is the implementation of DBMS on mid- and mini-sized computers. Examples are Image/3000 by Hewlett-Packard Co., Total by Cincom Systems and DBMS-11 by Digital Equipment Corp.

Somewhat the dark horse in the data base field, at least for the present, is the role that the Codasyl specifications for DBMS standardization are to play in the evolution of data base systems. This issue greatly divides current data

base thinking.

There are three essential steps in close DBMS evaluation:

1. *A list of DBMS evaluation criteria is devised.* A sample list is presented in Figure 4. The first two criteria — consumption of system resources and interfacing with a generalized teleprocessing system — should be singled out for especially close attention.

2. *An effective strategy for incorporating the unique needs of the installation into the evaluation process is defined.* One such strategy is presented in Figure 5. Its distinguishing characteristic is the weighing of individual criteria according to their importance to the needs of the organization.

3. *The DBMS themselves are rated.* Information for this rating may come from a variety of sources:

- Vendor presentations and literature. (A "demo" can sometimes be arranged, though often at a cost to the users.)
- Recent periodical publications and other independent studies.

An Algorithm for Evaluating DBMS

- Step 1. For the individual criteria within each major evaluation area (see the preceding list), assign relative weights based on an average score of 100. Each weight should reflect the importance of the criterion to the overall philosophy and projected hardware configuration of your installation. The accuracy of the evaluation depends on a realistic estimate of these weights.
- Step 2. Rate each DBMS package on each criterion, assigning a score of 1 to 10. This score reflects the strength of that system for the given criterion; the higher the score, the better the system.
- Step 3. Multiply each criterion's weight by the rating of each DBMS package on the given criterion. This gives an evaluation score for each package on each criterion.
- Step 4. Total each system's evaluation scores for every criterion within an evaluation area. This gives the relative strength of each system for each evaluation area.
- Step 5. Total each system's area evaluation scores across all areas. The result is an estimate of the overall strength of each package, given your relative criteria weights.

Figure 5

DBMS Evaluation Criteria

I Capabilities and Requirements

1. How much core and overall system resources are required for effective DBMS operation?
2. Is the system part of (or easily interfaced with) a generalized teleprocessing monitor?
3. Are integrity and protection features (back-up, audit trail, checkpointing, recovery, etc.) sufficient?
4. How effective is the teleprocessing interface in selective program back-out?
5. Does the system give performance statistics (for performance monitoring and reorganization)?
6. Is the system (easily) complemented by a capable report generator?
7. Is the system (easily) complemented by a capable query language?
8. Are sufficient utilities supplied, especially for file conversion, reorganization, and loading/unloading?
9. Is the system efficient for both batch and on-line processing, or does it handle one at the expense of the other?
10. How difficult is fine-tuning and ongoing maintenance? What resources are required?

II Flexibility of the Operating DBMS

1. Is the system modular, in the sense that when one portion of the data base is down, other operating areas remain unaffected?
2. How well can user access to data elements and records be controlled? Is data independence supported to the data element level?
3. Is a subschema capability supported? What type of access control and retrieval enhancement does it provide?
4. Are multiple data sets per data base supported so that only active portions need be loaded?
5. Are multiple user languages (for instance, FORTRAN and PL/I) supported?
6. What devices are supported for data base storage?
7. Is the system designed for concurrent retrieval and concurrent access?
8. In the absence of the on-line portion of the DBMS, is a copy of the DBMS required for each batch program? Can a single copy support concurrent data base access from multiple batch programs?
9. Where does support for concurrent access fall?
10. How good are search capabilities (for instance, is the language easy to use, and is sufficient expression building supported)?
11. Is the system more efficient for retrieval or for updating? Is performance for the other seriously degraded?

III Standardization of the DBMS

1. Does the system follow CODASYL specifications? Is the system available on other hardware lines?
2. How much is the data base locked into the DBMS?
3. Is the data directory externally readable and/or standardized?
4. Are data encoded/decoded or compressed/decompressed? Is the feature optional? How much storage space can be saved?
5. How dependent is the system on COBOL?

IV Investment of Professional Resources

1. Is the system difficult for the application programmer to use efficiently?
2. How much actual DBMS implementation is done by the user installation?
3. How much DBMS support is provided by the vendor?
4. How much ongoing physical mapping must be done by the user installation?
5. Is the system well documented?
6. How difficult is selective or massive data entry?
7. What type of data dictionary capability is provided? What services are offered? How difficult to use is the data dictionary?

V Design of Storage Structuring

1. What are the limits on the number of:
 - Record or segment types?
 - Searchable fields per record?
 - Occurrences of a single repeating group?
 - Record or segment type per set or hierarchy?
 - Interfile relationships?
2. Is inversion supported? Is the inversion technique actually indexed access or inverted access? Is indexed-random access supported? How difficult is the inversion to use?
3. How difficult is it to add new fields to the data structure?
4. How difficult is it to change data structures? What can be changed? What impact does the change have on existing applications?
5. How "expandable" is the data structuring?
6. Are variable-length records supported by the DBMS? How strong is this support? Is the feature difficult to use?
7. What facilities are provided for supporting sequential processing of data base files? What overhead is engendered?
8. What facilities are provided for supporting ad hoc searching of data bases and for relating previously unrelated files?

Figure 4

IN DEPTH

• Communications with current users of the system. (The DBMS vendor can be persuaded to supply a list of representative users.)

A log of evidence supporting each rating should be carefully maintained for future reference.

The evaluation should be undertaken by a team consisting of representatives from those areas most affected by the data base project: management, operations and application systems. Ideally, each member of the team should arrive at ratings independently.

One thing to remember in rating a particular DBMS on a given criterion, especially when the evidence consists

largely of user comments from other installations, is that every application situation is different; what is good for one organization may not be good for another. Another point to keep in mind is that many organizations have benefited from the expertise of outside consultants, most of whom have been through the selection process many times before.

The results of the evaluation process must be accompanied by a detailed cost/benefit analysis. Items in this analysis should include:

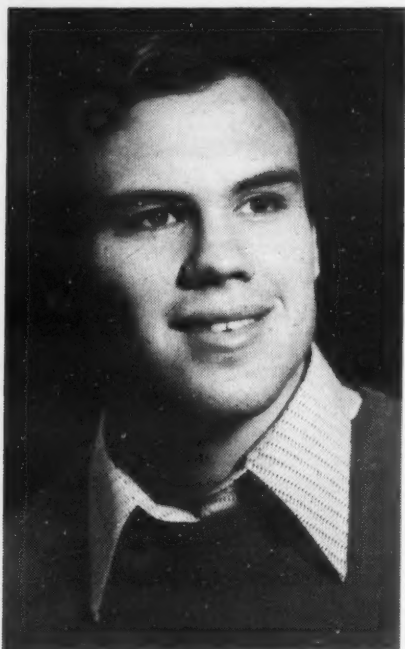
• The price for each package, including the projected costs for installation, maintenance, education, documentation and support. Some DBMS come in a comprehensive package, others come piecemeal; a quoted DBMS price

tag can therefore be deceptive.

• The quality of performance and support guarantees. Can the vendor back up the promises he makes?

• Conversion aids. Are they provided, or must conversion programs be written in-house?

• Projected changes in DP technology. Will they make the hardware and software outmoded?



Ronald G. Ross is senior staff consultant for data base systems at Performance Development Corp. in Princeton, N.J. He is the author of many articles and monographs on topics that range from data base administration to trends in data base management systems packages. Typical are "DBMS," An Overview of Data Base Technology from Government Data Systems and "The Data Base Administrator: What Is His Place?" from the Journal of Systems Management.

Ross, who is 27, graduated from Rice University with honors and holds an M.S. degree from the Illinois Institute of Technology.

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Portions of this chapter were adapted from two articles previously published by the author: "Evaluating Data Base Systems," Journal of Systems Management, January 1976; and "Data Base Management Systems: An Overview of Data Base Technology," Government Data Systems, December 1975/January 1976.

How Diablo improved my appearance.

By A. Letter

I didn't always look this good.

Sometimes I was even embarrassed to go out of the office. Then one day, my boss introduced me to the Diablo 1355 WP metal-clad print wheel. Suddenly my characters were coming out crisp. Proportionally spaced. And uniformly dense.

Since I discovered that Diablo has over 100 type styles, I'm never bored either. There's 88 characters to choose from in English. And 92 in foreign fonts. And the future looks even better. Because soon there will be 96 characters to choose from.

And thanks to the Diablo 1355 WP, I never have to worry about keeping up with the pace. Because the metal-clad wheel prints 40 characters-per-second.

It's durable too. In fact, the wheel that printed me today was no youngster. It was over 16 million characters old, but you'd never know it to look at me.

Not that I'm vain. But I am "camera ready" as soon as my page is finished.

And in my line of work it's important to make the right kind of impression.

Of course, it's only since they started using the Diablo 1355 WP metal-clad print wheel that I really became letter perfect.



XEROX

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Editorial

Standards: Talk, But No Action

A Presidential task force has now added its voice to others warning that de facto standards in the computer field may be harmful to the growth of the industry [CW, May 15].

Big deal.

For more than a decade, congressional committees, industry groups and other presidential committees have made this observation, but little has changed.

The addition of one more report is unlikely to improve the situation one iota as long as it remains advantageous for computer vendors to maintain a fragmented market — and there is little sign that this will change in the near future.

Manufacturers generally live off their own base of customers, getting most of their business by upgrading their installed systems, rather than taking market share away from other manufacturers.

It is not in their interests to have standardized systems so users will have a wide range of choices when upgrade time rolls around. After all, if the user has invested heavily in programs for a nonstandard system or language, that user will be less likely to change vendors when it comes time to upgrade.

And while all mainframers will say nice things about standards — as they will about apple pie, the flag and motherhood — they really don't want effective standards.

But at the same time, these same manufacturers have an effective stranglehold over the U.S. standards-making process. The manufacturers effectively control the American National Standards Institute, the voluntary arm for setting U.S. standards. Only those firms can afford to send representatives to the drawn-out proceedings of this body.

The mainframe manufacturers in particular control this group and

have only recently been challenged by the plug-compatible manufacturers on the issue of the standard I/O channel — but that issue is still being decided by vendors in the industry rather than users.

The other major standards-making body is supposed to be the U.S. government. As the world's largest user of computers, the government was given the responsibility to set governmentwide standards by the Brooks Act in the mid-1960s.

So far, it has been a dismal failure.

The National Bureau of Standards (NBS) is supposed to head this effort but has proven to be particularly vulnerable to vendor pressure and has therefore abdicated its responsibility almost totally.

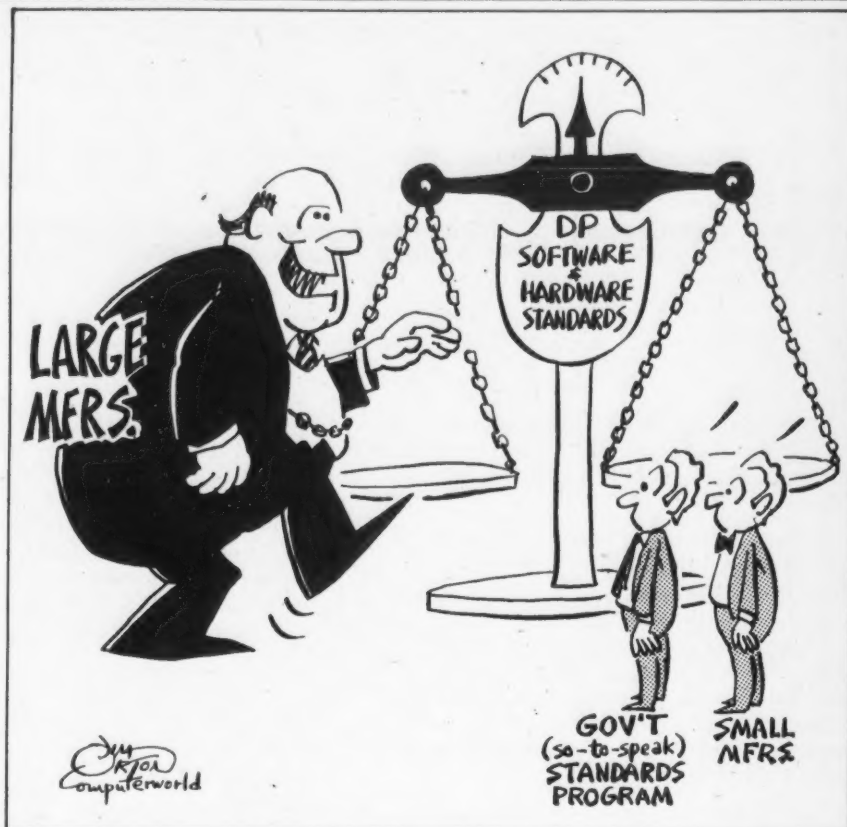
The bureau got the word loud and clear in the late 1960s when Dr. Herbert R.J. Grosch was summarily downgraded from the head of the Institute of Computer Science and Technology for having the temerity to speak out against the nonstandard IBM System/3. Since then, institute directors have been particularly circumspect and rarely say anything but platitudes about government DP standards.

The NBS has asked for a whopping budget increase in order, it says, to promote a more comprehensive standards effort, but unfortunately what the agency needs is not so much more money, but more courage and more principles.

Any full-fledged standards effort is going to raise cries of protest from the mainframers and other manufacturers, and there is nothing in the NBS budget request that indicates it will have the guts to stand up to those pressures.

In 10 years, there will probably be at least two or three other presidential reports decrying the lack of standards and warning of the dangers of de facto standards.

Nothing is likely to change.



'After You, Gentlemen...'

Letters to the Editor

Grossly Unfair to IBM

I think CW was grossly unfair to IBM in the May 1 editorial, "Serious Flaws in Antitrust Laws." Specifically:

1. The real reason(s) the Department of Justice did not ask for interim relief is unknown.
2. That IBM is a monopoly has not been proven.
3. CW said, in effect, that if IBM pursues its legal rights in court, it's called "maneuvering" and "delaying tactics"; if the government pursues its rights in court, it's OK.
4. The articles "An IBM Surprise" and "East vs. West: A Matter of Style," of the May 1 issue, counter your long-trial issue.
5. If IBM is trying to delay, why did it not request that the case be thrown out of court? That, on rejection, would have been good for at least a year.

E.N. Weaver

Radnor, Pa.

Problems With Stock Summary

The "Computerworld Stock Trading Summary" is a compilation of stock prices that generally is useful to those of us following the industry.

However, its usefulness is seriously marred by its failure to take account of such important changes as stock dividends and splits. This makes for some apparently weird stock price changes.

I refer specifically to the May 15 summary, which suggested that Amdahl Corp. stock plummeted 48.7% in the week ended May 10. This indicated 27-point "collapse," of course, did not occur because the change in stock price was effected by a two-for-one split.

I urge CW to take steps to avoid such inaccuracies in the future in

order to provide a more useful listing for all its readers.

Robert L. Christensen
Vice-President

Becker Securities, Inc.
New York, N.Y.

Points Out 'Minor Flaw'

There was one minor flaw in the otherwise superb article by Rita Shoor, "Technician vs. User" [CW, May 15].

The "i" in Erisa stands for "Income," not "Insurance." This might suggest a 7th rule: "Listen" (inserted just after Rule 1, "Ask Questions").

David R. Cummings
Bridgeport, Conn.

Progress in San Jose, Too

We in San Jose read with interest "Library Saves \$370,000 on System Conversion," [CW, May 1] about the automated circulation system progress in Tacoma, Wash.

When Kevin Hegarty and his colleagues from the Tacoma library visited the San Jose Public Library in March, 1977, we were most happy to share with him the conversion process we had undertaken in 1976 — that of loading available data bases into our minicomputer and seeking matches by entering cataloging numbers or author/title. San Jose has enjoyed a hit rate of at least 80%.

San Jose now uses OCLC, a computer-based shared cataloging service, for cataloging assistance and catalog card production. In order to economize further on time and to increase accuracy, a light pen attachment was added to our OCLC terminals.

Richard E. Rendler
Chief, Public Services
San Jose Public Library
San Jose, Calif.

Data Past

Eight Years Ago June 3, 1970

LOS ANGELES — A survey of some major Western cities — Los Angeles, San Francisco, Seattle, Phoenix and Dallas — showed an almost nonexistent job market for the programmer with one year or less experience. Sources in all cities reported employers were requiring two, three or four years' experience including experience on the employer's particular model of computer and his languages.

GENEVA, Ill. — Errors attributed to faulty keypunching affected the tax bills of 32,000 persons, put the Kane County Computer Center here 2-1/2 months behind in its work, added several months to the session of the county board of review and cost taxpayers an unestimated sum to redo the tax cycle.

Five Years Ago May 30, 1973

ST. PAUL, Minn. — A bill pending in the Minnesota legislature would put non-Bell competition in jeopardy by giving the state Public Service Commission the power to regulate any supplier that installed or maintained equipment connected to the telephone network, including carrier and noncarrier vendors. If approved, the impact could be disastrous for users of customer-provided equipment including modems and terminals.

TULSA, Okla. — Action on the IBM counterclaim to Telex's \$1.2 billion antitrust suit continued with Telex rebutting charges that it hired IBM engineers to steal trade secret information. A Telex witness said that the firm wanted to hire the best possible people and that those people were working at IBM.

With Firm's Profits in Mind Programmer Can Relate to Business Goals

By Jack Stone
Special to CW

Information systems managers over the years have been impressed with the way systems programmers dedicate themselves to technology. On the reverse side of that coin, they have been continually discouraged about how little loyalty is shown by these programmers toward their company.

Certainly when I reflect on the systems programmers I have known, I believe this characterization applies. At least it did until last week, when I met one who feels strongly that he can tie his services directly to the profitability of his company. Although this programmer's situation may be unique, I am going to relate it anyway, in the hopes that management information systems (MIS) managers will be encouraged to find ways of reorienting some of that systems programming dedication toward company goals and objectives.

This systems programmer is employed by a vendor of digital equipment and services. He is currently assigned to one of that firm's internal MIS departments which has a large-scale computing system installed. He is an internal technical consultant, responsible for solving problems of interfacing his com-

pany's products to the computing system software. He built a solid reputation for attacking these very complex interface problems with gusto and solving them in short order.

One day, a resourceful salesman called him to solicit his help in a customer account. The customer was trying to write some interface code to support one of the company's products and was having considerable difficulty. The technical staff in the sales department did not have the level of knowledge necessary to solve the problem.

The programmer expressed considerable interest in providing this support, and an arrangement was made whereby the salesman could "purchase" his services.

It was in his dealing with customers, albeit on a highly technical level, that the programmer acquired an entirely new set of attitudes and perceptions about his company. Here is what he had to say during our interview:

Q. How did you view your job prior to expanding your responsibilities to include customer support?

A. My job is that of an expert problem solver in a very narrow, specialized technical field. Frankly, I feel a great sense of pride and achievement when competent tech-

nical people come to me for help, because they know that I have superior knowledge in my field.

You can call it an "ego trip," but I don't see it that way. It's just that many systems programmers in a

spectives about the business.

Q. How has the marketing support function changed your viewpoint?

A. Well, it has done a lot for me and without much effort on my part. You see, the salespeople I deal with only ask me to solve the same class of problems that I face internally. But now, I can directly relate my effort to a sale that would not have been made without my expert consultation. I can point to profits of the company that resulted from my personal efforts and that is a measure of performance I never had before.

Q. How has the marketing experience affected your attitude toward your company?

A. Well, that's an interesting question. Let me put it this way. Do you remember the ethics question that posed the situation in which a programmer writes a utility program on company time to help him and then takes it with him to a new job? Well, prior to this sales support experience, I would have had no qualms about taking a program I wrote with me and not telling the company, as long as the utility was not a direct assignment of mine. But now, I'm not so sure.

Letters to Stone should be addressed to him at Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.

The Human Connection

similar capacity find substantial psychic rewards in providing service to other people, sometimes more than those associated in writing, for example, an extension of an operating system program.

Q. And what was your feeling toward your company?

A. Well, I work for a good, solid company. They pay a competitive salary and offer standard fringe benefits. But what is exciting is that the technology of our computing installation is at the leading edge, and that is where I must be if I am to maintain my technical competence.

It is also important to note that I am very busy in my job and don't really have much time to learn about other operations in our company. And I have to add that our director certainly hasn't seen fit to provide much information or training programs to broaden our per-

Produces Two Forms

Method Gives Documents Clarity, Precision

Robert Green of Lawyers Word Processing, Ltd. has a different way of showing how DP can help improve legal documents from the method suggested in my Feb. 6 column. He achieves the same virtues of clarity and understandability, but without taking the risk of rewording legal technicalities.

The problem with rewording legal documents such as wills is that the rewording may obscure their meaning. The standard will, like other legal documents, is created primarily by using a "fill-in-the-blanks" concept that has been proven over the centuries. This technique uses pronouns and references to reduce the chances of error by reducing, to the maximum extent, the number of blanks that have to be filled. The resultant language is precise, but it isn't too understandable.

My approach to get understandable and precise language was to use the power of computer logic to effectively look up the contents of various blanks, change them to fit grammatically and then fill in the later document references. These then show what is actually going on without using pronouns, references to the "said parties," or "the condi-

tions of subparagraph C." This allows both accuracy and nonambiguity of reference, as well as readability.

Green has achieved this in a different way. He starts with a single input, such as the questionnaire, and may or may not include various boilerplate paragraphs. However, the technique produces from this, at the same time, one traditional legal document and a readable summary of the provisions of the legal document. The summary is known to be accurate because it comes from the same computer input.

'One-Into-Two' Technique

This one-into-two technique is very effective. While visiting Chicago, I was able to see that this technique can maintain uniformity between two areas of a document, which is, and always has been, the basic problem of legal technology. Yet, the procedure also permits the use of traditional phraseology to give the maximum legal protection, while providing, on the other hand, an understandable version which simply isn't acceptable to the legal areas because it isn't traditional to provide documentation understandable to the layman.

"One-into-two" was used to prepare a complicated trust-sharing document and a summary. Profit-sharing trusts are perhaps as suitable for this approach as any other document. This is because most of the clauses are approved by the In-

ternal Revenue Service (IRS), which is accustomed to certain formats. There would be nothing legally wrong with submitting other clauses to the IRS in an understandable form — but it would certainly delay the approval process.

The output was two separate documents — one on legal size and the other on 8-1/2 by 11-in. paper. The phrasings in each were equally different, but the accuracy of the relationship of the two documents was totally controlled by computer program.

I haven't gone over the accuracy of the Lawyers Word Processing program. However, it would not be difficult to check. It would simply be a matter of exercising each of the options and producing side-by-side listings of each of the resulting phrases. It would also require checking the unchanged existence of the program, each time it is operated; checking that someone familiar with the program, the hardware and the compiler agrees with the logic illustrated at the source level; and spot-testing.

Currently this checking development has not taken place, at a theoretical level, but the system has been tested by the experiences of many attorneys. Experience is an equally honored method of checking, although I personally prefer using both experience and theory.

However that may be, the one-into-two approach is clearly new and valuable. It may be restricted

to the legal profession, because of the fact that part of the output of legal work is documents that can be easily checked as having specific, known reasons, and therefore not given to causing disputes.

If this is so, then it can be argued that the same approach may not be suitable in fields such as education and medicine. But I'm not certain of this.

Indeed, I think the one-into-two approach can be adopted, although for slightly different reasons. Many professionals be they skilled lawyers or skilled engineers, often need to talk simultaneously on two levels of understanding — i.e., to their professional associates and to others who have a particular interest in the immediate situation, but no interest in the profession's technicalities.

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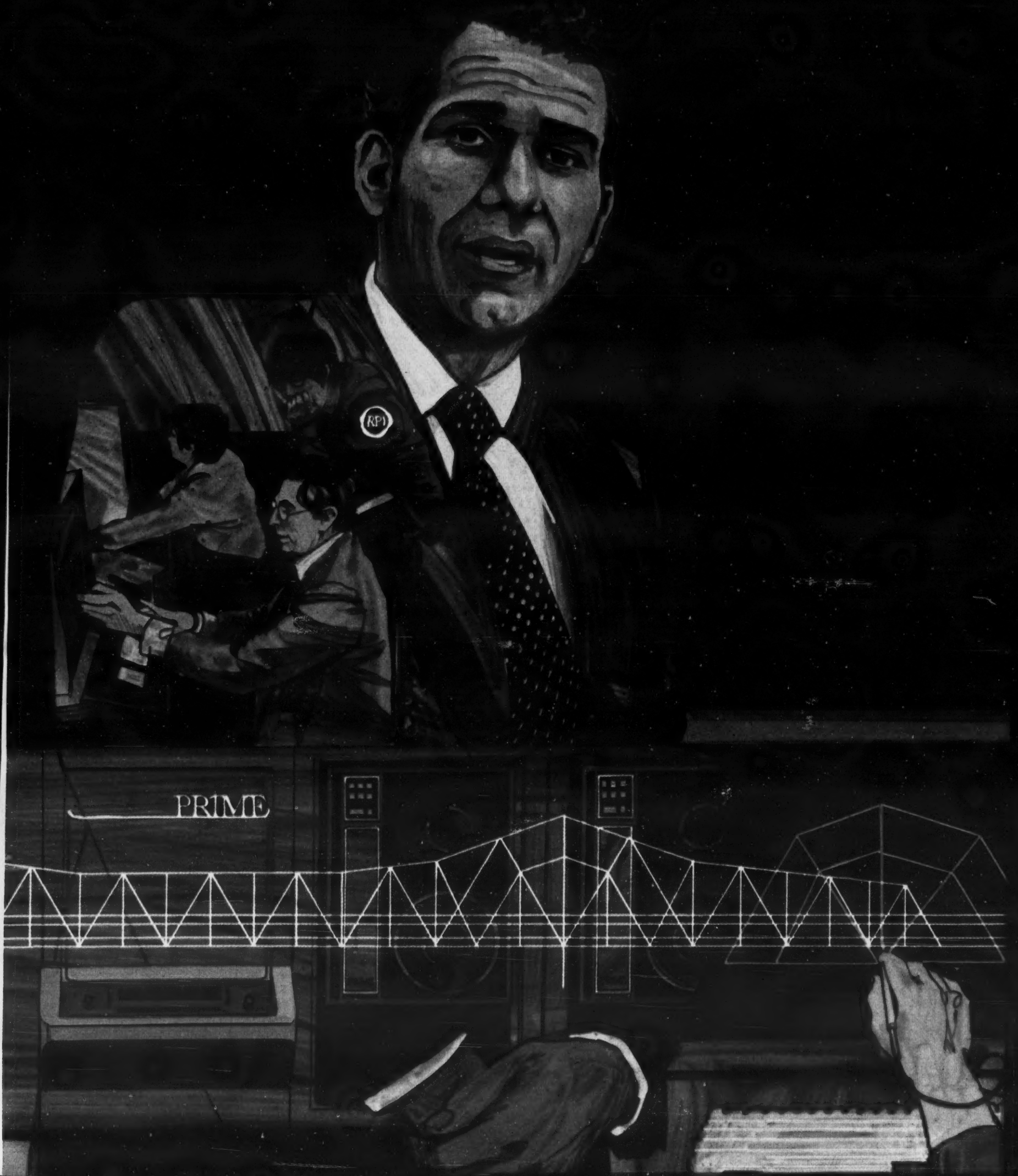


'Electronic Mail Fraud, No Doubt.'

The
Taylor
Report
By
Alan
Taylor
CDP

"Conventional computers only give students correct numbers. Computer graphics develops engineering intuition."

Dr. George S. Ansell, Dean of the School of Engineering, Rensselaer Polytechnic Institute, Troy, New York.



Engineering educators at Rensselaer Polytechnic Institute, one of the country's top technological universities, believe that interactive computer graphics offers students, especially undergraduates, an intuitive, visual understanding of engineering problems and concepts that conventional computers, with their emphasis on abstract data, have failed to provide.

To put that belief into practice, RPI needed a computer powerful enough to support 36 interactive graphics terminals simultaneously, and versatile enough to meet the needs of multiple engineering and scientific disciplines. They chose dual Prime 500 interactive timesharing computers.

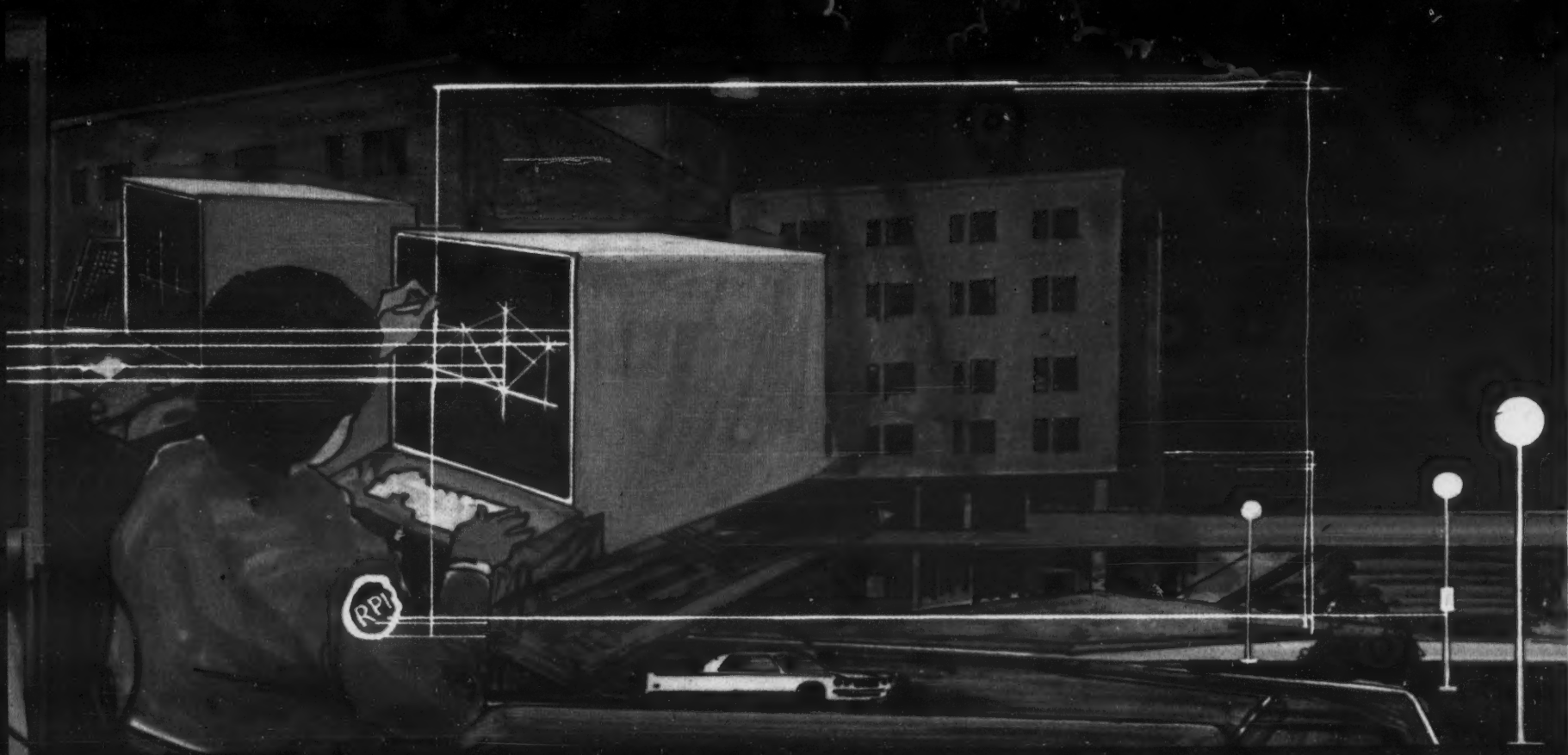
Prime's family of interactive computer systems offers industry standard software including FORTRAN IV, BASIC, RPG II, COBOL, and a CODASYL-compliant Database Management System. They also have greater memory capacity than any other family of small computers: up to 8 million bytes of high-speed main memory, 2.4 billion bytes of disk storage, and 32 million bytes-per-user of virtual memory.


Prime computers are also true multi-user systems: one computer can handle up to 64 simultaneous users in such diverse activities as RJE communications, forms processing, on-line data entry, computational time-sharing, and database management. And the PRIMOS Operating system allows any user to use any language at any time.

For the detailed story of how Prime is helping RPI, and for more on how we might help you, contact Joseph A. D'Angelo, Director, Market Planning, Prime Computer, 40 Walnut Street, Wellesley Hills, Mass. 02181.

PRIME Computer

"Prime is helping"





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in Canada is because it deserves to.**

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In Canada, quality is a tradition. And any product that tries to make it there had better be long on quality. Because without it, it won't be accepted very long.

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Graham, Texas 76046



Ecoma Attendees Told Performance Measures Not Good Enough

By Don Leavitt
CW Staff

LONDON — While computer performance evaluation (CPE) and measurement are gaining acceptance in many installations, CPE studies have generally been started in response to a specific problem. That's not good enough, according to Carl Van Tassel.

The U.S.-born director of Paris-based Tesco-Software admitted to the recent meeting of the European Computer Measurement Association (Ecoma) the hit-or-miss approach to CPE "sometimes provides striking results."

"However," he added, "we believe that all studies would benefit from a structured approach which would improve the results, even for the spectacular success stories."

The structured approach to performance management is based on four basic ideas and not one of them is — or should be — surprising, Van Tassel said. In the first place, he

noted, different people require different information in order to judge how well a data center is functioning.

In the second place, "performance measurement should be performance-oriented," he reminded the delegates. Most performance measurement activities gather statistics on resource utilization — percentage usage of a channel, multiprogramming level, etc. — but they should be focusing on terms to which the user and management can relate.

In general, user and management satisfaction is a function of the cost of a given level of service, and that, according to Van Tassel, can be measured by such things as percentage of deadlines met, average and maximum turnaround or response time and the accuracy of results or number of reruns.

'Larger Than Machine Room'

Once the CPE team recognizes the need to produce statistics in user-meaningful terms, the third idea behind performance manage-

ment becomes obvious. The performance problem is larger than the machine room, he pointed out.

It is of little use to optimize the computer if the data capture or forms handling operations are the real bottlenecks. "The user is not happy if his job is given top priority on the computer, but he waits several hours for his printed output," Van Tassel said.

The entire DP department should be viewed as a pipeline through which work flows, and any major disturbance or bottleneck reduces the capacity of the entire pipeline, he said, adding it is also necessary to verify that the flow is continuous and that the priorities associated with the jobs are respected throughout the pipeline.

Even though the same level of sophistication may not be required at each point in the system, at least basic measurements are necessary at all levels to ensure that the real problems — which may have absolutely nothing to do with the computer itself — are detected, he warned.

Management Commitment

For his fourth point, Van Tassel reiterated the idea that creation of a performance management system requires a commitment and the active participation of management far more than does a simple performance measurement study. That participation is needed both in the definition of the objectives of the system and in providing a means for its development.

The first step in creating the system is to get a general overview of what's happening now. This considers both resource utilization and costing and user satisfaction. Even the first pass at measuring usage may reveal some corrective actions that can be taken and some savings that can be realized, he said.

Having previously noted that there is more to performance management than concern for the computer and its peripherals, the speaker reminded his audience that optimization of the center is certainly part of the total plan he had in mind.

Performance management of the data center itself focuses on such things as scheduling and capacity analysis, he said. Scheduling of some form is in place in every center but good balancing of all the requirements of each job, in terms of resources and external constraints, is a highly complex task.

He noted it becomes extremely difficult to measure the performance of a center if the user does not indicate what his service needs really are. Therefore, user and management have to get together to establish just what service levels are expected or required. From there, performance management can become a reality, Van Tassel said.

'Adabas' Moves to PDP-11

BOSTON — Available only for IBM 360/370 users until now, the Adabas data base management system (DBMS) from Software AG will be available for Digital Equipment Corp. PDP-11s as well by early next year, according to a spokesman.

In the meantime, several enhancements to the mainframe-oriented DBMS will be released this summer, he told an Adabas users conference here last month. Both the Adabas Data Dictionary System and the Adacom batch report writer are due out in July while Natural, a natural programming language, is expected to be ready in September.

Developed for the DEC PDP-11 models 34 through 70 under RSX-11 and the IAS operating systems, the mini-based DBMS is driven by a data dictionary system. It includes an ad hoc query language described as a subset of Natural and supports applications written in Basic, Cobol, Assembler and Fortran, along with conversational teleprocessing.

Described as entirely reentrant, multithreaded and priority dispatched, the system is in Alpha testing and scheduled for general release in January 1979 for an introductory cost of \$40,000.

The Adabas data dictionary provides 20 standard reports designed to meet the data-entry cross-reference needs of data base administrators, application programmers and end users, the spokesman said. Utilities are provided to interface with other Adabas components, he added.

The dictionary will be available to all Ada-

bas users who have Adamint as a standard feature of their system. It is currently being tested under DOS, VS1 and MVS, the company said.

Natural provides both programmer and end user with facilities for updating, inquiries and reporting in both a batch and on-line mode. The language supports full logical relating of data as well as looping and iterations, the spokesman asserted.

Set for release in late summer, Natural will cost \$24,000. More information is available from Software AG, 11800 Sunrise Valley Drive, Reston, Va. 22091.

Data Base Standards Topic of NCC Talk

ANAHEIM, Calif. — "Data Base Standards: Is Codsyl an Acceptable Choice?" will be the topic of discussion in a 45-minute presentation by Kent A. Ochel, executive vice-president of MRI Systems Corp., on Tuesday, June 6 at 11 a.m. in the Buena Park Room of the convention center.

Ochel plans to give up this segment of his company's commercial seminar time, he explained, because the basic question of standards is so important and has raised so much interest in the professional and trade press lately.

The session is open to all at NCC.

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'Pathfinder' Tracks Program Logic

STOCKHOLM, Sweden — The Pathfinder package from DataAnalys AB is said to analyze the flow of transactions through an ANS Cobol program so that programmers and their managers can determine if all possible alternative logic paths have been executed.

Use of the package should assure the project manager that a given set of test data covers all existing paths. Pathfinder would also show if a program contains coding that is not executed by authorized transactions, a DataAnalys spokesman said.

With Pathfinder, the user can optimize program logic through trying to minimize execution time by measuring and analyzing the frequency of all entered paths. All these functions can be carried out without any extra manual work, he claimed.

He explained that Pathfinder accepts the user's Cobol program (directly or through a program library routine) and analyzes the source code to locate and flag every node of all existing paths. The test support package also

inserts a communications area in the user's program.

Normal compilation then takes place, and the resulting object program is linked together with the Pathfinder Execution Supervisor and Dynamic Reporting Module. The linked program is then passed forward for execution, DataAnalys said.

During execution, Pathfinder reports are produced both dynamically and for printout at end of run. If abnormal termination occurs, the DataAnalys

spokesman continued, Pathfinder intercepts, generates its own reports and passes control back to the operating system.

Implemented on IBM 360/370 equipment and presumably adaptable to most mainframes with ANS Cobol facilities, Pathfinder is available for \$3,000 from Skeppsbron 18, S-111 30, Stockholm, Sweden, or from affiliated offices in Helsinki, Finland; Den Haag, Holland; Dusseldorf, Germany; and Paris, France.

Programmer Tools Linked To Unix Operating System

GREENSBORO, N.C. — Coupling the Bell-developed Unix operating system for Digital Equipment Corp. PDP-11s with a range of tools for development projects of varying sizes, the Programmer's Workbench (PWB/Unix) is now available through West-

ern Electric.

In addition to the facilities of Unix itself — a multiprogrammed, time-sharing operating system for the DEC minis — the PWB/Unix package includes, for example, a word processing system with editing, text formatting, spelling and typographical error-detection capabilities, a Western Electric spokesman said.

That part of the Workbench can provide commands to control a variety of style and ordering needs in document preparation of program books, letters and legal briefs, he explained.

Other facilities include remote job entry (RJE) support to submit jobs to and get results from an IBM mainframe. A source code control system (SCCS), described as an integrated set of commands, was designed to help programmers control changes to source code and to files of text.

Unix requires a minimum 48K on a DEC PDP-11/40, 45 or 70 with memory management, disks and upper and lower case Ascii support. PWB/Unix is available for a one-time charge of \$30,000 for the first CPU and \$10,000 for each additional installation, from the Software Licensing Manager, Western Electric, P.O. Box 25000, Greensboro, N.C. 27420.

'UCC Three' Adds Backup

DALLAS — Disk-based data sets can be moved to tape automatically to make better use of disk space with the DASD data set migration/backup enhancement for the UCC Three — Automatic Direct Access Management (Adam) package from University Computing Co. (UCC).

With the enhancement, the user can free a significant portion of an installation's DASD space currently consumed by infrequently used data sets and can create backup copies of critical data sets for recovery purposes, a spokesman noted.

Flexible criteria are provided for the automatic selection of data sets for migration/backup, he said, but specific requests may also be made so that individual data sets outside the normal criteria can be saved. All data set types, including Vsam, are supported, the spokesman added.

UCC Three analyzes DASD usage, status and space availability and provides a flexible method of deleting data sets not protected by the system. The system also gathers data in real time concerning DASD space consumption and directs the allocation of new data sets.

The previously available Volume Reconfiguration feature copies data sets from one volume to another to minimize the number of free space extents, to yield a better fit and to consolidate multiple extents for individual data sets, he continued.

UCC Three runs on any OS-based IBM 360/370. Written in ALC, it costs \$15,000 or \$640/mo or more depending on features and operating system, the company said from 8303 Elmbrook, P.O. Box 47911, Dallas, Texas 75247.

Harris Systems Gain 'Basic-V'

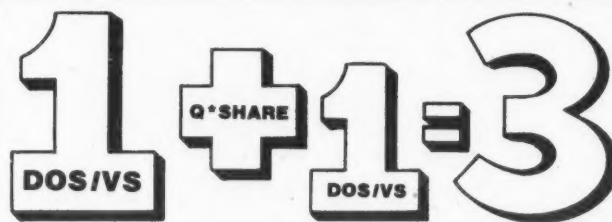
FORT LAUDERDALE, Fla. — Two separate reentrant language processors — one an interpreter, the other a compiler — are included in Harris Computer Systems Basic-V. Both are consistent with ANS Basic 78, a spokesman said.

The interpreter processes and analyzes each line for syntactic errors as it enters the system. This allows changes to be made quickly, he explained.

The compiler is used once the program has been developed and, hopefully, debugged through use of the interpreter.

Compiled programs also have the ability to CALL externally compiled subroutines. This means programs written in Basic-V can access Total data base management routines or utilities such as Harris' Vulcan Indexed Sequential Package (Visp), the spokesman added.

The package costs \$5,000 and it can be ordered from Harris Computer Systems, 1200 Gateway Drive, Ft. Lauderdale, Fla. 33309.

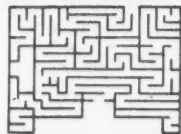


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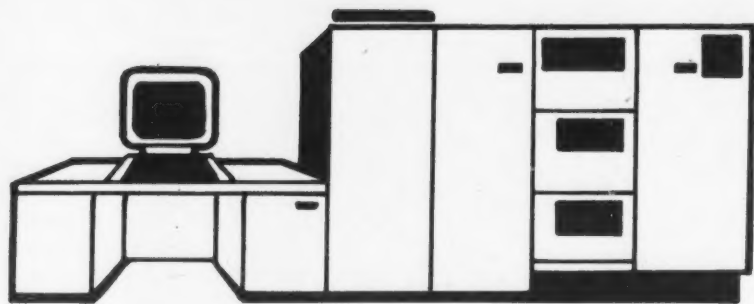


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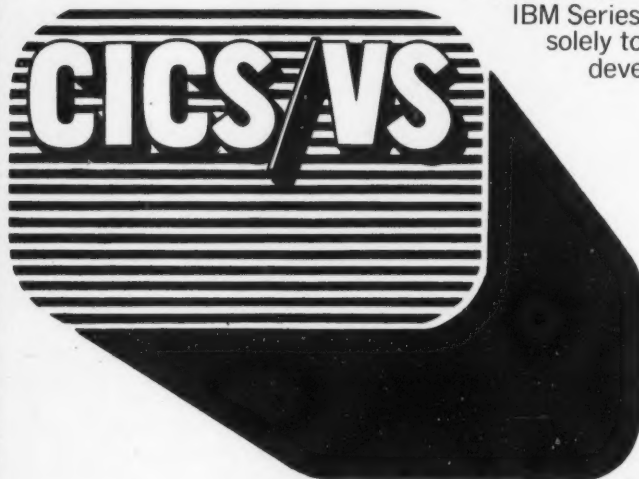
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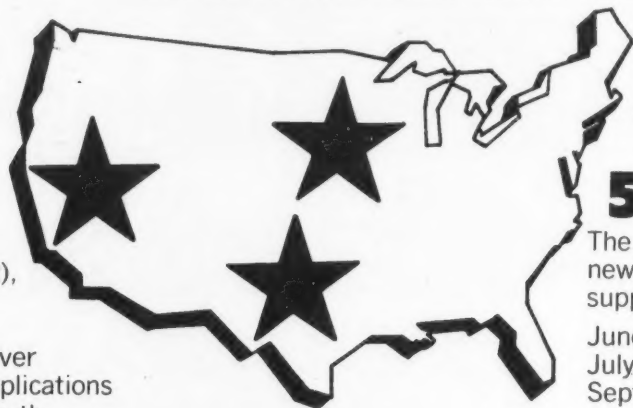


- 4** The July 4, 1978 availability of LIOX, an advanced super-set of OXFORD's DFAST/VS and TFAST/VS, and the first true catalog based, media-independent, dynamic data set allocation and security system for DOS/VS users. LIOX is designed to support future multiple logical transient



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- 5** The opening of new sales and support offices:
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- 3** A base of over 500 users worldwide.



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Picking an RJE Vendor — Part 2

Each Firm's 'Track Record' Must Be Evaluated

By Richard J. Poje

Special to CW

When choosing a firm to provide remote job entry (RJE) services, the vendor's track record should be analyzed in terms of financial stability, system availability, turnaround for the type of work likely to be processed by the customer and necessary rerun rate, regardless of cause.

Financial stability may be difficult to evaluate since many vendors are privately held or are part of larger organizations and do not publish their financial data. A credit check can generally be performed, however, and it often reveals as much as or more than the vendor's balance sheet.

Site inspections and careful reviews of vendor control systems can also be extremely helpful; they provide an im-

The selection of a remote computing service vendor is not necessarily simple. In his previous column, Poje — who is president of Phoenix-Hecht Inc., Chicago — discussed cost, flexibility, security and control as considerations. But there are others, as he explains here.

mediate indication of the vendor's investment in and commitment to the RJE business.

As a rule of thumb, the easier it was for the vendor to enter the business, the easier it will be to leave it.

System availability, turnaround and rerun rates should be easier to quantify since quality vendors will have this information close at hand, will be eager to review it with prospective buyers and will back it up with customer references.

Subjective Analysis

Some subjective analysis will be necessary because each user's needs are slightly different, but the data itself should be readily available. For instance, a vendor's mean turnaround may be 30 minutes, but that may be

the average of two minutes for third-shift program complications and six hours for a first-shift production job with heavy resource requirements.

A customer with first-shift production needs may well be disappointed under these circumstances and find it necessary to pay steep premiums for high-priority access in order to complete necessary work. Likewise, a vendor may advertise 99+% system availability, but have a production job which uses 10 of its 12 mountable disk drives for several hours daily. This reduces effective system availability for all customers with mountable disk requirements.

The vendor's installation standards manual should be a help in evaluating such situations, and all quality vendors have such documentation for use by customers and prospects.

The needs of potential RJE customers are diverse and frequently extend beyond requirements for computer time and communications network availability. The vendor's ability to provide such services — specifically interactive time-sharing or conversational RJE, technical support, user training, programming, consulting, data entry and computer output microfilm — is an important consideration in the selection process.

This is true even if the need for such services is not immediately apparent in the customer's organization. DP requirements have a way of changing rapidly, and both present and future needs must be weighed in selecting an RJE vendor.

Look for Packages

Almost without exception, major RJE vendors have been expanding their application libraries, and the use of "packaged systems" can mean substantial savings — both in terms of time and money — for RJE customers.

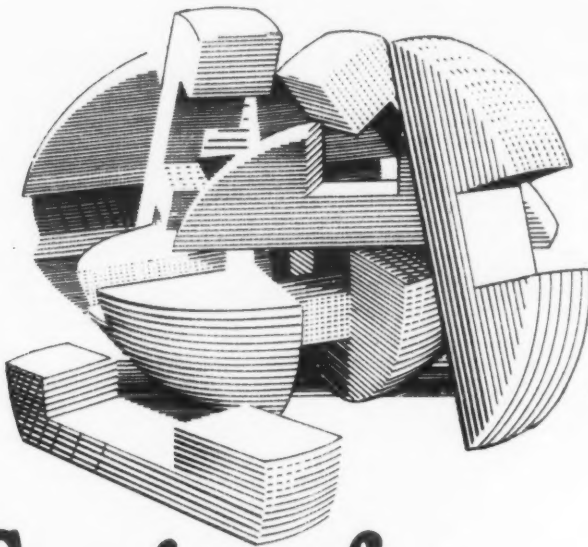
The so-called "scientific packages" — for statistical analysis, structural analysis and engineering design — are by far the most commonly available applications, but business oriented systems are gaining in popularity.

Payroll/personnel/labor distribution, accounts receivable, sales analysis, accounts payable and general ledger are the most common, but they are by no means universally available.

Programmer aids such as report writers, data management systems — and sophisticated utilities are also increasingly popular. These packages offer the RJE customer an alternative to expensive in-house development and a hedge against the uncertainties of the DP labor market.

Many RJE package users have found
(Continued on Page 34)

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**NATIONAL — SPECIAL LEAR SIEGLER ISSUE —
INFORMER**

EXTRA

May 29, 1978

AT LAST! THE TRUTH CAN BE TOLD!

**SHOCKING REVELATIONS PROVE, BEYOND A DOUBT,
LEAR SIEGLER'S PLANS TO DOMINATE THE NCC!**

Lear Siegler, Inc., reeling under enormous pressure brought to bear on its mysterious Project X, has finally consented to declassify its hush-hush undertaking.

Overwhelming outcries of the past several weeks have made Project X's continued secrecy impossible, and the INFORMER's relentless war against it was, apparently, too big a burden to shoulder.

At a press conference held late yesterday, a group of high-ranking LSI officials and Project X engineers unveiled the fruits of their months-long clandestine labor. Project X's sealed doors were

opened, and the wonder devices were seen and described in detail for the first time. It was an awesome sight, seeing the mechanisms in all their glory, there where they had their mysterious origins. INFORMER reporters noticed several involuntary gasps from others unprepared for the display.

Originally designed to guarantee complete mastery of this year's NCC (National Computer Conference), Project X was, from the

beginning, shrouded in secrecy and bedeviled by persistent rumors. Our intrepid undercover reporter, working perilously close to exposure deep within LSI HQ, risked detection constantly in his efforts to leak Project X data. Only through the greatest vigilance and determination was he able to prolong his subterfuge and continue to supply us with information.

Now, however, his perseverance has culminated in success, and Project X is a mystery no longer. Our unflagging campaign against the project, coupled with public outcry, has accomplished what

the government was not prepared to do, and the secrecy is over.

Within the pages of this week's INFORMER, the fabulous devices of Project X are reviewed in detail. Now, at last, here is the full story on Project X and the culmination of its labors.

The INFORMER wishes to publicly applaud its diligent, selfless staff of reporters, field operatives, and agents who, through their unceasing efforts, made this moment what it is—the disclosure of Project X.

COMPLETE DETAILS WITHIN

LEAR SIEGLER

ADM-31 Proves 2 Pages Are Better Than One

The ADM-31 is a low-cost, high-reliability desktop CRT with full editing, formatting and *two pages of display*. Not as an option, but as standard equipment. Which means the ADM-31 affords twice the display potential of terminals costing up to twice as much. And that's a pretty clever idea.

The ADM-31 is completely self-contained, with a keyboard, control logic, character generator, refresh memory, and interface. What's more, it incorporates a microprocessor which augments its reliability while making it even easier to use. Block transmission and *protected fields* are standard. And the terminal also comes with a printer port option, if you require printouts along with your readouts.

The ADM-31's amazing 90-key keyboard is actually capable of more functions than are now available on the ADM-1. What's more, the keyboard itself is integrated with the main logic, and is capable of generating all 128 ASCII characters (upper and lower case,

numerics, punctuation, and control). Among other things, it features an integral numeric pad, with period, comma, tab, minus, and numerals arranged in a familiar calculator format. And it also includes a caps lock key (to lock the keyboard into upper case display).

The ADM-31's editing capabilities let you clear the screen, or use a destructive cursor for a character change. Read and load cursor permits sensing of the current address, and direct, absolute addressing to any X-Y coordinate. The controls let you skip protected fields, backspace, foospace, move up, down, return, home, and new line. And you can store the Control Characters, and they'll display as a reverse image.

The ADM-31 comes with *character insert/delete*, line insert/delete, erase to end of line/field/screen, and back tab. All standard equipment. The ADM-31 can also clear to protected spaces, clear to unprotected nulls, and set and reset copyprint.

Who says a machine can't edit?



Project X's new ADM-31 desktop CRT, seen here with 90-key keyboard and Caps Lock Key. PROJECT X PHOTO

ADM-42 All But Thinks For Itself

The ADM-42 is a semi-intelligent terminal that gives the user flexibility of format, security, editing, interface, and transmission. Like the ADM-31, it features a full two-page display as standard equipment. And it also comes with an optional extended memory capable of adding data space in 2-page increments up to a maximum of 8 pages.

The terminal boasts a bright, easy-to-read, 2000 character display, a full 128 ASCII character set, 16 function keys for 32 separate commands, and five separate cursor control keys. You can also order an optional Programmable Function Key feature that lets you define the function keys. An alternate character generator with line drawing set is also optionally available.

The ADM-42's status displays on-screen disclose a wide range of information at a glance, and special symbols indicate the entry of all control characters in memory. The ADM-42's Field Protect Mode also allows rapid data entry into forms or instruction pages.

Like the ADM-31, the ADM-42's displayed data is formatted in 24 lines per page, with 80 characters per line. In addition, it offers something the ADM-31 doesn't. It has an 80 character 25th line, established and reserved exclusively for status indicators, or special messages.

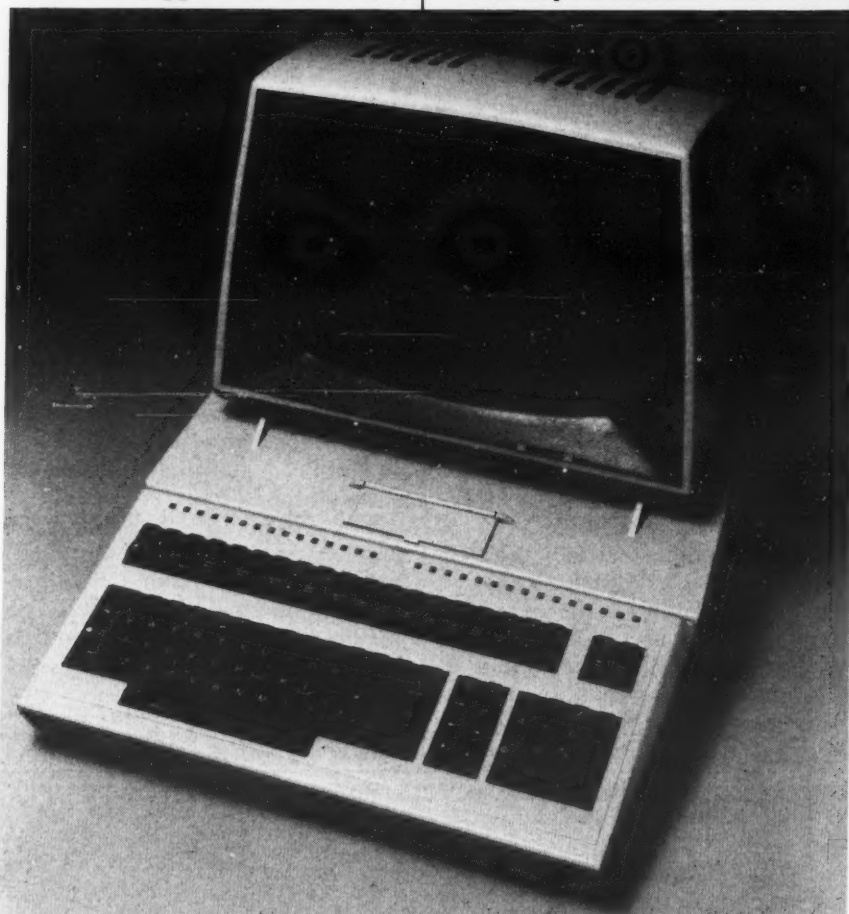
An additional special capability of the ADM-42 is Field Blanking/Underline. You or the computer can designate areas of the display as blanked fields, and the designated areas are then blanked from the display. Or an Underline attribute may be substituted for Field Blanking by switch control.

With Field Blinking, you or the computer can designate areas of the display as blinking fields. These areas of the display will then blink on and off.

And with Reverse Field, you or the computer can designate areas of the display as reverse images. These areas of the display will then reverse on and off.

The ADM-42, like all LSI products, is upward compatible. That means when you upgrade to the ADM-42, you don't worry about rewriting your software, or replacing any other peripherals. Just plug the ADM-42 into the system you've been using all along.

You'll discover this terminal is a truly efficient, cost-effective step upward that'll enhance your system out of all proportion to its price.



Project X's amazing new ADM-42 is a semi-intelligent terminal designed for a host of computer-related tasks. PROJECT X PHOTO

(Advertisement)

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REVEALS ALL!

Ballistic Printer™ Tougher In The Long Run

The 300 Series Ballistic Printer is a low-cost, 180 cps printer with a built-in microprocessor that gives you 15 switch-selectable form lengths, 15 perforation skip over formats, and full horizontal and vertical tabulation control. Space and blank character compression. Interface control for serial, parallel, or polling and addressing operations. Plus a non-volatile forms retention system that retains these programmable settings when power to the printer is turned off.

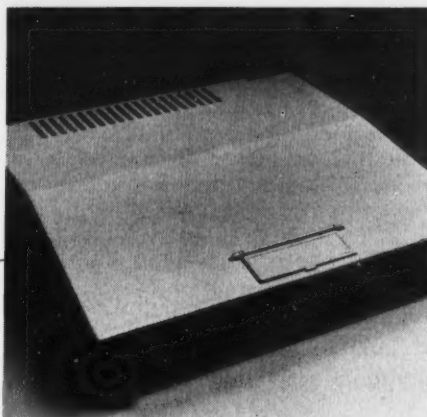
The 300 Series has a character buffer that's optionally expandable to 2048 characters. With the 2048 buffer, the printer can fully buffer a 1920 character CRT screen of data without waiting for the screen to transfer to the printer on a line-by-line basis. And the buffer affords quick dumps of full 1920 character CRT screens.

Like all LSI Ballistic Printers, the 300's dependability and negligible duty cycle restrictions originate with its ingeniously simple, patented Ballistic print head. It actually operates without moving cores attached to its print wires.

Instead, it uses small armatures that propel its matrix wires in free flight to the platen.

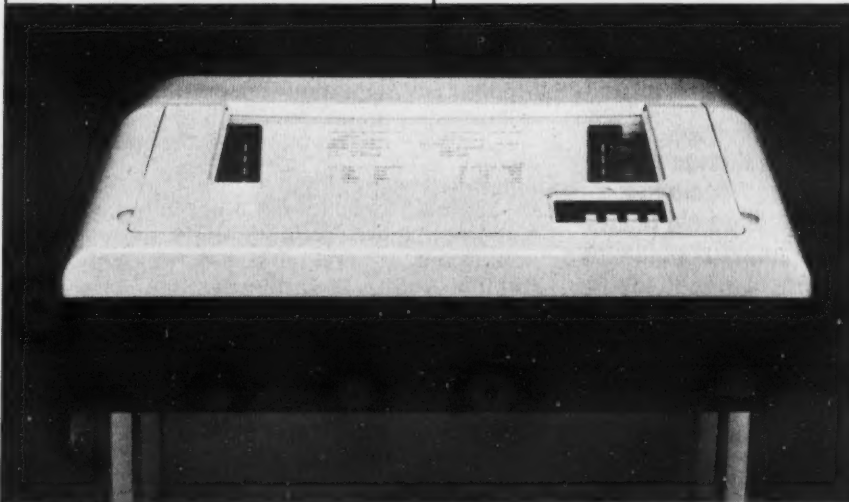
The 300 Series comes with a full 96 ASCII character set, with up to 128 printables optionally expandable to two sets of 128. The printer has, in addition, an elongated character capability, and 10 pitch with 12 and 10/16.5 dual pitch options.

This printer isn't built just simply. It's built simply to last.



Project X's new VDP-410 does just about anything you want it to do.

PROJECT X PHOTO



Project X's 300 Series Ballistic Printer must be seen to be believed.

PROJECT X PHOTO

VDP-1000 A Complete Small Data System

The VDP-1000 actually features many attributes commonly associated with larger systems costing many times more.

Attributes like BASIC, COBOL, and ASGOL programming lan-

guages for business and system applications. A virtual memory operating system (VMOS) that lets you develop stand-alone or segmented programs without regard to physical memory size.

And up to 40 megabytes of disk storage capacity. You start with a choice of two disk systems and three languages, and configure your system from there.

The basic VDP-1000 consists of a 16-bit CPU, 32K, 16-bit words of dynamic RAM, the world-renowned Dumb Terminal™, a 180 cps, bi-directional 300 Series Ballistic Printer, and either a 10 megabyte cartridge or 1.25 megabyte floppy disk. All of the electronics, CPU, memory, and disk come in a full-size, wood-grain desk that leaves the surface clear for the console and printer. And there's also convenient work area for the operator.

Once you have the basic system, you add additional storage as you need it. Or want it. Up to four 10 megabyte disk drives or 5 megabytes of floppy capacity. You can upgrade the console with a choice of five smart terminals. And you can add a second or even a third programming language as your needs change or multiply.

The VDP-1000 is exactly the system to meet your needs exactly.



Project X's incredible data system gives you all the features you need, at a price lower than you'd expect.

PROJECT X PHOTO

VDP-410 An Intelligent Building Block

Meet the VDP-410.

It's a low-cost, 16-bit CPU with enough speed and ports to support a variety of peripherals. It provides OEMs with the flexibility to configure a multitude of systems. From communications controllers without external storage capabilities, to sophisticated time-sharing systems with a string of terminals, printers, and disks, the VDP-410 feels right at home in any and all of them.

The 410's DMA channel provides easy expansion. You can even get a cable and an expansion chassis with five slots for 15" cards and a hefty power supply. LSI also offers a disk controller and 10-megabyte disk that complements its entire line of terminals and printers.

The basic system consists of a CPU with 200 nanosecond instruction cycle time, and 16-bit, 32K word memory with a 250 nanosecond access time, and I/O capabilities for communication with three external devices. The CPU, by the way, also includes an expansion port with serial/parallel I/O capabilities.

The VDP-410's instruction set, memory organization, and I/O architecture are compatible with hardware made by Data General and other manufacturers. Operating systems, file management systems, and programming utilities are available from leading software houses as standard packages, so it doesn't take any custom configuring to please the VDP-410.

The VDP-410's instruction set is Nova* compatible, and provides memory access, arithmetic, logical, and I/O functions. It's augmented with load/store-byte, inclusive/exclusive OR, exchange accumulators, multiply/divide, and block mode. And this offers the OEM an incredibly powerful instruction set for tasking and data management.

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Service Checks Motivation

KANSAS CITY, Mo. — The Selindex software recently added to the United Computing Service (UCS) program library has been described as a system designed to measure and analyze personnel development factors such as motivation, leadership, creative initiative and executive strength.

The program's statistical foundation is an extensive data base compiled from hundreds of actual job performance composites. Additionally, Selindex, Inc. — the package's developer — provides optional validation studies applicable to specific industries and in accordance with professional standards, UCS said.

The subject of the study completes

a questionnaire by making responses on a scale from zero to 100. Certain responses are codified.

Selindex reads the raw scores, computes the indexes and produces a detailed analysis report predictive of potential in the areas of sales and management. A distortion indicator analyzes and quantifies response consistency, the spokesman noted.

The entire procedure requires less than 30 minutes to complete, but it is said to have correlation coefficients ranging from .65 to .90 when matched against concurrent predictive performance studies.

The international UCS network is based at 2525 Washington, Kansas City, Mo. 64108.

'Doc-F' Produces Reports, Source Library Documents

ALLENTOWN, Pa. — The Doc-F package from Software Consulting Services is a text formatter written entirely in ANS Cobol. Its 34 commands allow users to position, justify and paginate text, according to a spokeswoman.

The program is said to process any user-prepared file of text with case and formatting information and produce a formatted document, normally on the user's line printer. Any combination of upper and lower case input and output devices is supported, she said.

Automatic page heading and numbering as well as footnoting and auxiliary file merging commands make the system "extremely versatile," the

spokeswoman added, noting that the package is currently being used for such things as producing reports, maintaining source library documentation and generating form letters.

Source code to allow Doc-F to be used as either a stand-alone executable program or a callable subroutine is available for a one-time license fee of \$900. Software Consulting Services is at 901 Whittier Drive, Allentown, Pa. 18103.

Check Vendor's Entire Record

(Continued from Page 30)

their savings so substantial that, in effect, their use of the remote resource has been free — direct savings have exceeded direct costs. On this basis alone the availability of packaged systems — indeed, the size and scope of the vendor's entire software library — should be carefully analyzed and heavily weighed in selecting a source for RJE service.

Don't Ignore Cost

While cost is not the only factor to consider in evaluating RJE vendors, it is not to be ignored. All vendors use some form of pricing based on resource usage, and no two pricing formulas are directly comparable, at least on paper. Benchmarking is about the only way to relate one vendor's formula to another, but even that is only the start.

A well prepared multijob benchmark will test the vendor's formula under several conditions, most commonly the CPU-bound job, the I/O-bound job, the program compilation and high/low operator intervention jobs.

A benchmark, however, tells only a portion of the story. Minimum charges for job steps and JCL errors, storage charges and the costs of most "nonjob"-oriented work are often not included in pricing formulas, although they may represent a significant portion of the user's total billing.

Discounts for high-volume or off-shift use are often handled outside of billing algorithms, as are premiums for high-priority access, and some costs may be buried completely. For instance, everyone has a sorting routine, but some routines, particularly those supplied by hardware manufacturers, are considerably more resource-intensive than others.

One vendor's sort may be two or three times as costly as another's and, since sorting is a major DP function, this difference can be expensive. The prudent RJE purchaser will look beyond the vendor's pricing algorithm to determine the true cost of services and will use the total cost of a vendor's service rather than the resource usage formula as the basis for price comparison.

Vendor selection should be based on the user's own needs and objectives. RJE vendors are no more alike than the companies which use them.

Compare costs, but while comparison shopping, also evaluate a potential vendor according to your requirements for service, security, control, reporting and special programs.

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Telenet Chairman Reports

Private Packet Nets Attracting Users

By Ronald A. Frank
CW Staff

LAS VEGAS — Private packet networks offer an alternative for the user who does not want to use a public packet net, according to Dr. Lawrence Roberts, chairman of the board of Telenet Communications Corp. Telenet has provided several private packet nets, mostly for common carriers, on a turnkey basis. But several users have expressed interest, and the first of these will be initiating a private network within the next two months, he said here at the recent International Communications Association (ICA) conference.

Although at present, private packet nets are now priced much less than other options, this alternative is attractive to users

Typical cost for this equipment is about \$25,000 plus \$600-to \$1,000/line, depending on software and hardware requirements, he estimated.

The X.25 standard has proved to be an effective method of interfacing directly to packet nets. But users who want to connect noncompatible devices such as those that use Ascii or Ebcidic, the packet assembler/

disassembler (PAD) capability provides a solution, he said.

An application for the Bell Data Network will be filed soon, Roberts predicted. But it will be about four years before an AT&T packet net gives Telenet any real competition, he said. It is possible that Bell might offer a pricing advantage on short-haul local
(Continued on Page 38)

Communications Management Seen Becoming New Discipline

By Ronald A. Frank
CW Staff

LAS VEGAS — Telecommunications managers are leading their companies into the new world of electronic business communications (EBC), according to William G. McGowan, chairman of the board and chief executive officer of MCI Communications Corp.

Delivering the keynote address at the annual conference of the International Communications Association (ICA) here, McGowan said telecommunications management is being industrialized into a brand new industry known as EBC.

Three major forces — industrialization, technology and government — are all coming together to shape EBC. Functional boundaries between computers and communications are disappearing to be melded into a stream of digital impulses, and government is interacting with both the technology and industrial processes, he told ICA attendees.



CW Photo by R. Frank

William McGowan

In a very real business sense, EBC is already becoming a principal business activity of every business enterprise in America and the efficiency of a company's EBC determines its position among its competitors, he
(Continued on Page 38)

CW at ICA

because it provides complete network control and saves the user from having to bother with maintenance.

Turning to recent events in packet standards, Roberts said the recently approved X.5 standard of CCITT will provide for a standardized method of interfacing packet nets. A worldwide numbering plan called X.25 has also been completed so that public packet destinations will be uniformly identified by a 14-digit total address, he said.

Up to now, most terminal support on the Telenet network has been for asynchronous devices, but beginning this year, IBM 2780 and Hasp will be supported. And in 1979, 3270-type CRTs will be supported on the network, he said.

Next year, Telenet will also initiate support for Systems Network Architecture/Synchronous Data Link Control terminals. Support of non-IBM protocols is not planned, but if a user wanted to contribute toward the cost of the necessary software development, this would be possible, he said.

A user contemplating the installation of a packet network switch today has several alternatives. Bell Northern Research has introduced the SL-10; the Sesa switch developed for the Transpac network in France; and the TP-4000, available for use on the Telenet network. Nippon Electric Co. is also expected to introduce a packet network switch soon, Roberts predicted.

FCC May Decide on Inquiry II At June Meet, Attorney Says

LAS VEGAS — The Federal Communications Commission (FCC) may make a decision on the Second Computer Inquiry when it considers the issue at a meeting on June 8, according to James Smith, staff attorney with the FCC's Common Carrier Bureau.

One of the main problems in trying to define the boundary between communications and data processing is that it is difficult to determine how much processing power can

be built into a terminal before it changes from a communications unit to a DP device, Smith said here recently at the International Communications Association conference.

The Common Carrier Bureau staff has sent its recommendations to the commission for it to consider when it meets on the inquiry. Although he would not comment on the contents of the staff report, Smith said there
(Continued on Page 38)

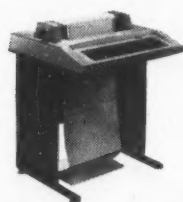
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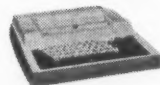
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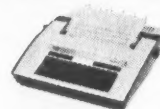
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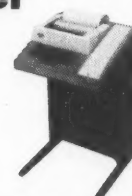
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National has built add-in memories for some of the most popular minicomputer models as well.

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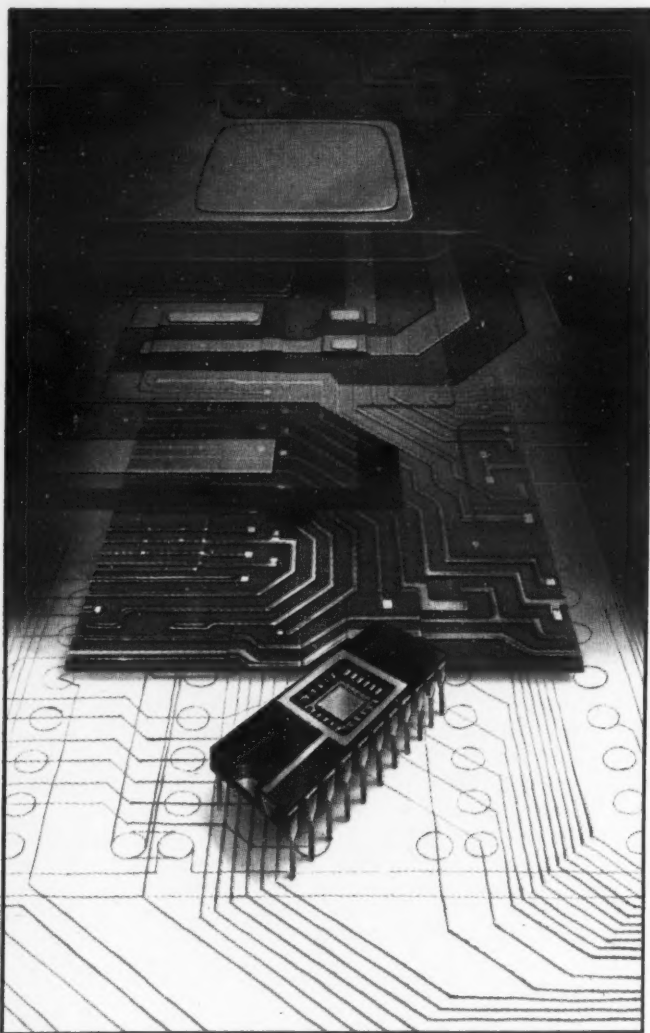
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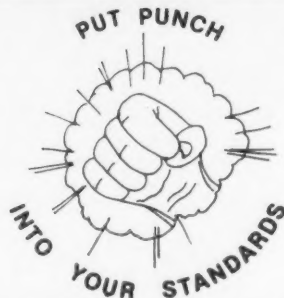
If you'd like to know more about the future of National Semiconductor, Computer Products, or about System/400 specifically, write me personally: Charlie Sporck, President, National Semiconductor Corporation, Drawer 1, 2900 Semiconductor Drive, Santa Clara, California 95051."

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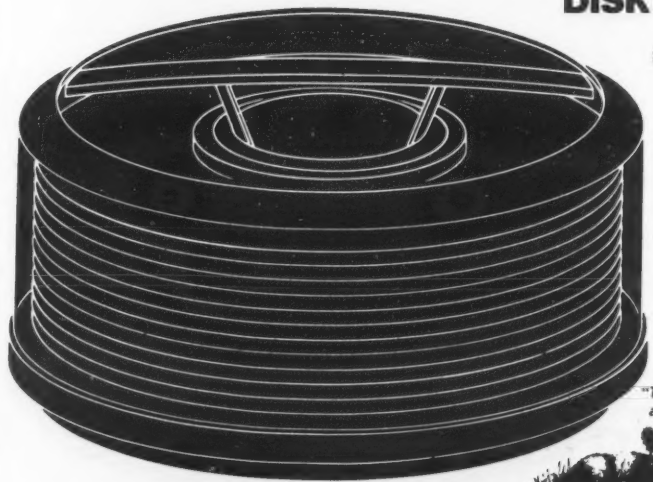
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HIS Adds Level 6 Software To Expand Communications

WALTHAM, Mass. — Honeywell Information Systems, Inc. has introduced three Level 6 communications software modules to provide its multifunctional minicomputers with additional capabilities. Two of these modules include programs that enable the Level 6 to function concurrently with a variety of host computers as a Hasp workstation or 2780/3780 remote batch terminal, according to the firm.

In addition, the company has signed agreements enabling it to market Henco, Inc.'s Info 6 file inquiry and update system to Level 6 minicomputer users.

All three modules are compatible with the Gcos 6 software announced last October, HIS said.

The Level 6 Hasp workstation facility and the 2780/3780 remote batch terminal facility allow the user to transfer data between a Level 6 and a variety of host processors with no change to the host processor's software, a company spokesman said.

Info 6 is a conversational data inquiry/update system. Using English-language commands, customers can reportedly perform normal DP functions without utilizing conversational programming techniques. Info 6 runs as an application under the Level 6 Gcos 6 Model 400 operating system

and may be executed concurrently with other applications, the firm said.

License fees for these software modules are \$2,200 for Hasp, \$1,640 for the 2780/3780 remote batch terminal module and \$3,800 for Info 6. The two communications modules will be available in the third quarter of 1978, and Info 6 is available immediately, HIS said from 200 Smith St., Waltham, Mass. 02154.

Private Packets Attracting User

(Continued from Page 35)

loops when and if its network becomes operational.

If that happens, Telenet would have several options to get these facilities from other carriers.

When batch usage starts to be significant, it will be economical to include satellite facilities such as Satellite Business Systems or American Satellite links into the Telenet system, he said.

Current costs make it more economical to provide interactive-type services with terrestrial facilities while batch and higher volume traffic can be justified with satellite links, he said.

New Discipline Described

(Continued from Page 35)

said. The more efficiently information flows, the more accurately and effectively corporate decisions can be made.

Just as companies have come to realize how crucial DP is to the conduct of their business, so EBC deserves their attention. As corporations begin to realize the contributions that telecommunications is making to corporate success, the needed budgets and staff resources will begin to flow in that direction, McGowan predicted.

A variety of common carriers have emerged to sell services to the EBC user. Specialized value-added, general-purpose and satellite carriers are all eager to satisfy a user's EBC requirements.

It takes trained managers to evaluate these different offerings to cross-check benefits and itemize trade-offs, he said.

Today telecommunications managers are responsible for 80% of their companies' telecommunications budgets. One hundred percent of the telecommunications budget is subject to the influence, advice and guidance of these same managers.

Change compounded by competition has put a brand new emphasis on tele-

communications management. It has accentuated the manager's skills in anticipating, planning and controlling to make things happen instead of merely allowing them to happen, McGowan said.

As users such as ICA members take advantage of these opportunities, they will be industrializing telecommunications into EBC. This task will include both the user and the supplier as well as top management, which must be made aware of the enormous changes in telecommunications that will daily and deeply affect the future growth and direction corporations will take.

More and more companies realize they can prosper only with expertise in EBC. Telecommunications managers are the catalytic agents necessary to balance communications supply and demand within predetermined dollar constraints to lead their firms into the world of EBC.

If users can manage their vendors and make them prove that their services can make company operations more efficient and if users can make government respond to encourage diversity and innovation, then the shift to EBC will be successful, McGowan concluded.

FCC Decision Seen Coming

(Continued from Page 35)

were several options available to the FCC.

One approach would be to adopt the report as a decision of the carrier bureau chief. This has been proposed in a petition by the Computer and Business Equipment Manufacturers Association because it would provide a framework for interested parties to comment, he said. Another possible approach

would be for the commission to further refine its proposed definition of communications processing.

One of the complicating factors associated with the inquiry is the 1956 Consent Decree which limits AT&T to providing regulated communications services. Although the FCC has no direct jurisdiction over the decree, some accommodation might be made based on the recommendations of the FCC.

To Help 'Shape Environment'

ICA Votes to Participate More in Regulatory Affairs

By Ronald A. Frank
CW Staff

LAS VEGAS — One of the most influential telecommunications user groups has voted to become more involved in regulatory issues. The vote concerning participation in regulatory affairs was taken at the annual conference of the International Communications Association (ICA).

At issue were changes to the ICA by-laws proposing the elimination of the complex procedure under which the ICA board of directors could take a position on regulatory issues only under limited conditions.

Speaking to the conference before the vote, outgoing ICA president F. Thomas Hogan of Monsanto Co. said that historically the ICA has been very hesitant to become involved in regulatory matters. However, the user organization is "operating in an evolving environment that we should help to shape."

For this reason, it would be in the best interest of users for the ICA to become involved with the regulatory community, particularly in matters of interstate nature, Hogan said.

Since the Carterfone decision, there have been more and more developments and decisions that have great impact on the ability of users, specifically telecommunications managers, to function in the best interests of their individual companies. Some of the issues that have had a direct impact on ICA members in the past or will have in the future include specialized carriers, the interconnection of customer-owned equipment, the Bell Bill, rewrit-

ing the Communications Act of 1934, satellite communications, Satellite Business Systems (SBS), MCI Telecommunications, Inc.'s Execunet and a number of dockets now pending before the commission.

CW at ICA

This latter category includes the Computer Inquiry II, Wats, MPL and Series 1000 telegraph services, Hogan said.

In recent years the ICA has attempted to interface with the Common Carrier Bureau of the Federal Communications Commission, the Office of Telecommunications Policy and the telecommunications committees in both the House and the Senate. "This has been extremely frustrating for those involved, since we can only act as a fact-gathering group and cannot take a position in the name of ICA," Hogan told the attendees.

Participation in regulatory affairs does not mean lobbying. Instead, it is an opportunity for users to make their views known. In addition to taking a position, the ICA would be able to respond with impact data, users' concerns, statistical information and alternative concepts, he said.

A change proposed in the ICA by-laws would permit the organization to take a position quickly to reflect the users' viewpoint without noting the specific company composition of the ICA or those wishing to take such a position, he explained.

Products Bow at Conference

LAS VEGAS — Several vendors unveiled products at the recent conference of the International Communications Association (ICA) here. The following firms were among those exhibitors.

Codex Corp. of Newton, Mass., introduced an addition to its Circuit Quality Monitoring System (CQMS) it said has the capability to automatically sequence through each modem in a network for diagnostic purposes.

Called the Automatic CQMS, the unit costs \$8,750 or \$300/mo on a two-year lease. It can monitor up to 64 modems from one console and detect such problems as phase hits, phase jitter, harmonic distortion and dropouts, Codex said.

The DMW Group announced a software package that enables users to analyze corporate phone bills for a variety of management and engineering purposes. The package is written in Cobol and can be installed on in-house CPUs, accessed via the Tymshare network or processed on a service bureau basis.

Called Telecost, the package analyzes Bell System Station Message Detail Recording (SMDR) tapes or similar output data from non-Bell electronic PBXs. Telecost is priced at \$10,000 to \$12,000, depending on options, with 120-day support. The DMW Group is at 2975 Hickory Lane, Ann Arbor,

Mich. 48104.

MI² Corp. showed its Design 300/1200 data set that can operate at 300- or 1,200 bit/sec over dial-up or private lines.

The unit costs \$895 from the vendor at 1212 Kinnear Road, Columbus, Ohio 43212.

Officers Picked To Lead ICA In Coming Year

LAS VEGAS — Edward Venum of LTV Corp. was elected president of the International Communications Association (ICA) for the coming year at the group's annual conference here recently. Venum succeeds F. Thomas Hogan of Monsanto Co., who became a member of the board of directors.

Elected vice-president was Wylie Deaking of TRW, Inc., while Lloyd Isaacs was elected second vice-president. George Fallat of Dupont was elected treasurer of the users' group, while Walter Heide of McGraw-Hill became secretary.

Other users elected to the board of directors include Phillip Evans of Ashland Oil and Raymond Reamer of IBM.

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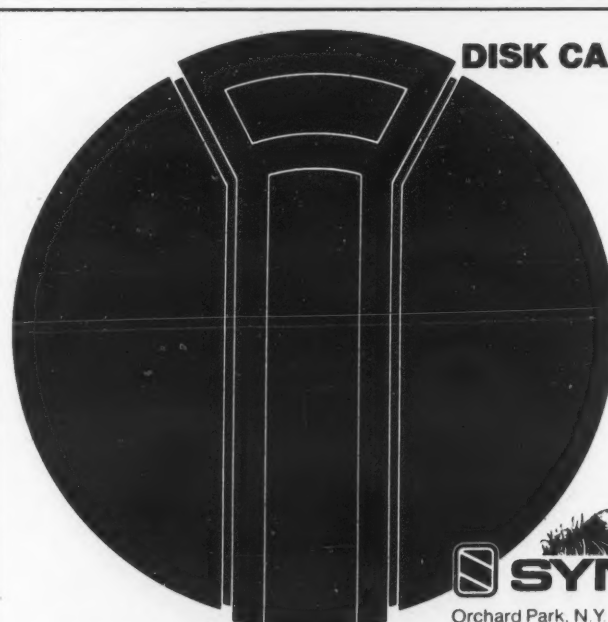


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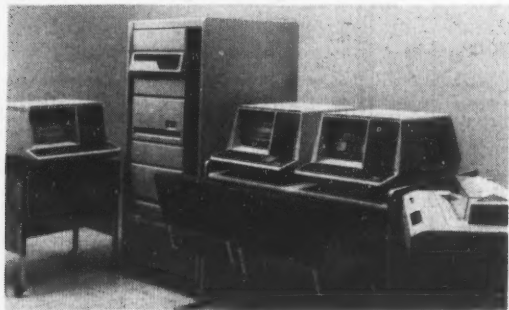


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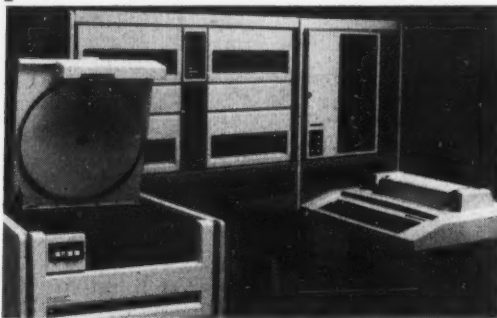
Now you can get a Data-system 325 package with the



new 10 megabyte RLO1 disk subsystem. Bigger and faster — and what's more, it's less expensive. That's right. Datasystem 325 featuring Digital's LSI-11 central processor, 64K bytes of main memory, and the VT52-N terminal is now the biggest bargain ever.

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Workstation, Printer Extend TRW Bank System

LOS ANGELES — TRW Communications Systems and Services has expanded its transaction-processing system by introducing a modular financial workstation specifically designed for the thrift industry.

According to the firm, the workstation gives the institution more options in setting up teller windows, extending on-line operations to other locations and lowering costs per workstation.

The company also announced a 180 char./sec line printer for report printing at remote locations is available.

TRW's Series 1500 modular workstation is made up of several components that can be configured to perform as a teller terminal, administrative terminal, new accounts terminal, loan officer's terminal or telephone

operator's inquiry terminal. Its basic elements are a CRT display, a transaction keyboard and a microprocessor-based controller.

Three keyboards are available, allowing the institution to select the most appropriate for each workstation, the firm said. Each keyboard has an optional, built-in magnetic stripe card reader that can be used in conjunction with a personal identification number (PIN) entry pad.

A validation and receipt printer can be added to the workstation; TRW's passbook print station operates as a module of the Series 1500, the firm said.

The Series 1500 CRT coupled with the intelligent controller make possible three types of prompting techniques:

tutorial, component entry and menu, according to a spokesman.

Tutorial is a step-by-step user-programmable process that leads the teller through a transaction in English phrases, displaying what has been done and what to do next.

Component entry allows the operator to first enter the data, then identify it by using a function key. The menu technique asks the teller questions and then lists possible answers to describe the transaction during entry.

The CRT screen displays up to 480 characters (12 lines with 40 char./line) and a dual-page feature permits automatic recall of an additional 480 characters, according to the spokesman.

The Series 1500 offers a choice of three keyboards in meeting the trans-

action requirements of each workstation, the firm said. Each keyboard features a 10-key numeric pad, programmable function keys and a supervisor key lock switch and can be shared by two tellers.

Each keyboard also has an optional integrated magnetic strip card reader which reads Track 2 data and normally works in combination with a PIN pad, the spokesman noted.

The modular workstation's local, microprocessor-based controller controls the display, keyboard, plastic card reader, PIN pad and receipt printing modules and can work in conjunction with passbook print stations, which can be shared by up to eight tellers. Its intelligence permits self-standing, off-line operation and supports communications between each workstation and TRW's terminal processor, the firm claimed.

Journaling Capability

A TRW terminal processor capability has been added for electronic journaling, in which all transaction data is captured on a 10M-byte disk that can store a day's transactions from up to 40 terminals.

If communications with the central computer is interrupted, the disk continues to capture all transaction data.

The purchase price of a basic Series 1500 terminal consisting of controller, keyboard and CRT display is \$2,600. A typical main office plus three-branch transaction system including 18 terminals, shared receipt and passbook printing capabilities, magnetic stripe reading and PIN pads plus terminal processor sells for \$117,000 and leases for \$2,200/mo.

Purchase price for the system line printer is \$7,000 with a monthly lease rate of \$132.

Deliveries of the Series 1500-based transaction-processing system will begin in July. TRW is located at 9841 Airport Blvd., Suite 620, Los Angeles, Calif. 90045.



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Guide Lists Services For Business Managers

CHERRY HILL, N.J. — The Management Information Corp. (MIC) has introduced a brochure, "Personal Information Services for the Business Manager," described as a valuable guide for businessmen in "every aspect of DP." The guide is free.

The booklet contains a listing of publications and services geared to DP managers. Among the services described in the brochure are monthly newsletters containing evaluations of data entry equipment, small business systems, data communications and distributed processing equipment and applications software packages. The list includes reports that investigate the management of data entry personnel, usage and concepts of data communications for the businessman, an analysis of how small businesses use computers and how to purchase a software package.

The guide also contains information on data entry management and supervision seminars that are held on a regular basis throughout the year.

Users interested in obtaining the brochure should contact MIC at 140 Barclay Center, Cherry Hill, N.J. 08034.

Cybernetics Proceedings Published

NEW YORK — The proceedings of the Third International Congress of Cybernetics of Systems, Bucharest Romania, have been published by Springer-Verlag New York, Inc.

The three-volume set has information on all official and "other" meetings and contains papers from seven sections of the conference.

General subject areas include economic cybernetic systems and management; systems and models; industrial cybernetics; cybernetics and environment; communication, education and informatics; artificial intelligence; and neuro- and bio-cybernetics.

Each of the conference sections in the books is supplemented with additional papers and editor's comments concerning the section.

The set costs \$150 from Springer-Verlag at 175 Fifth Ave., New York, N.Y. 10010.

Brochure Free from Philips

Philips Test and Measuring Instruments, Inc. is offering a catalog containing information, technical specifications and illustrations of its test and measuring instruments. It can be obtained from Department C, 85 McKee Dr., Mahwah, N.J. 07430.

Data Entry Managers Gaining Leverage With Users, MIC Says

By Frank Vaughan
CW Staff

CHERRY HILL, N.J. — The subservient role of the data entry department in relation to both the DP department and its users has been quite demoralizing to the data entry manager. The insistence, by most firms, upon improved productivity and increased accuracy has been unrealistic in view of the department's traditional status, according to a report published here.

"The People Side of Data Entry," by Management Information Corp. (MIC) noted that the emergence of the key-to-disk system has enabled the manager to both operate more efficiently and spot errors made by operators and users alike. With documented facts, the manager has had increased leverage in relationship to user departments. Furthermore, the department's ability to provide functions such as printing, data base retrieval and DP has given the department more authority.

With the trend toward distributed DP, user and data entry tasks are merging. The entry of data at its source means the data entry

system is becoming an internal part of user activities, and data will be generated by clerical rather than data entry operators, the report noted.

The data entry manager must be able to realize the latest trends and what is required to meet new challenges, the report said.

According to the report, during a recent seminar for data entry managers and supervisors, 10 areas of concern were most often mentioned.

- Personnel motivation. Operators treated as professionals will behave as such, the report said. For too long, the people involved in data entry have been kept off to the side and therefore felt excluded not only from the rest of the company, but even from the other DP activities.

- Better productivity. First, managers should determine the current productivity level, the report said. Next, they should review the entire operation: flow charts, decision tables (how many decisions, how often), condition of source documents, work schedules, training levels, machine utilization.

(Continued on Page 45)



First 3032 in Operation

Master Sergeant Thomas O. Kenton and Kathryn Gromen, systems programmers at the Air Force Data Services Center in the Pentagon, have been operating the first installed IBM 3032 processor. The Air Force

received the plug-compatible CPU this March [CW, March 27] and it is being used primarily to prepare and process intricate simulation models for the Studies and Analysis function of the Air Staff.

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Data Entry Managers Gaining Leverage With Users, MIC Says

(Continued from Page 43)

tion, quality of output and the like.

- Communications among employees. Perhaps the most important point, according to the report, is for managers to realize they have not communicated if their audience does not perceive something in the same way they do. The same word/phrase/cliche can mean quite different things to different people. If managers want to be sure they are conveying a particular concept, they should seek feedback.

- Motivation of senior employees. Senior employees may be more sensitive and resistant to change, whether it be the installation of new equipment or a new incentive plan. One reason for this is the fear they might not be able to adjust to the new situation. To overcome this attitude, managers should let them be a part of the decision-making process before the change is made. All changes — whether good or bad — are traumatic; it takes hard work, patience and understanding to make the change positive, the report noted.

- Operator Training. There is a learning curve associated with every new job, every change to a current application, every new person (experienced or not) and in every new situation. Training is a constant requirement; the question is whether to have a formal training program or a "sink or swim" one, MIC said.

- Equipment selection and upgrading. Do not base equipment selection on current requirements but rather on anticipated requirements for the next few years, the report advised. Servicing will be a critical point after installation and shouldn't be neglected during the selection process.

- Controlling quality and timeliness of user department input. The five major items in the relationship between the data entry department and the various user departments are quality of documents supplied by users, timely delivery of documents, handling of questionable data and errors in documents, timely completion of jobs by data entry and quality output by data entry.

- Problems with union shops. Union shops and government installations usually have a rather rigid working environment in which managers have limited flexibility. For example, unless a manager is running short of help, the operation will run out of work from time to time. A union or civil service employee cannot be sent home without pay. Managers have to have as little fat as possible in regular staffing.

- Workload distribution among operators, work scheduling. The three basic tasks are to establish personnel capabilities, set job standards and determine priorities. Various approaches discussed, according to the report,

were to have the supervisor distribute all work, to use a scheduling/control clerk or to set up a first in/first out system under control of the individual operators.

- Proper support from top management. While corporate management generally understands the CPU's ability to run programs, the evolution of data entry systems beyond the key-punch days is misunderstood. It is time for corporate management to realize that inaccurate data produces wrong information, the report said.

Other topics include hiring and personnel turnover.

"People Side of Data Entry" costs \$15 from MIC at 140 Barclay Center, Cherry Hill, N.J. 08034.

Dataroyal Has Smart Printer

NASHUA, N.H. — Dataroyal, Inc. has designed an intelligent printing system with a 120 char./sec keyboard send/receive (KSR) printer for applications such as data logging, factory data collection and label printing.

The IPS-7300 includes a movable CRT/keyboard station and an 8-bit programmable microcomputer, the firm said. The system has a gas discharge display and a 64-character, Ascii-compatible keyboard.

Through the keyboard of the movable input station, operators can communicate with the host microcomputer to enter data, access data from files or receive instruction messages, according to a spokesman.

The microcomputer incorporated into the unit supports variable character capabilities as well as relieving the

host computer of software control duties, the firm claimed.

It reportedly has the processing power to operate in a stand-alone environment or in a local or remote mode in an on-line system.

Basic Configuration

The basic configuration includes the onboard microcomputer with eight I/O registers and 10,000 bytes of semiconductor memory, a 32-character display, keyboard and an RS-232 asynchronous communications interface. A 20mA current-loop interface is available as an option, the spokesman added.

It costs \$5,500 in single quantity and \$3,135 in OEM quantity from Dataroyal at Main Dunstable, Nashua, N.H. 03060.

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Power Supply Has 42 Models

MELVILLE, N.Y. — Lambda Electronics has introduced a series of power supplies designed for military, industrial and OEM applications.

The LN series is made up of 42 models in five different package sizes. The units have single output voltages of 5V, 6V, 12V, 15V, 20V, 24V and 25V and are microprocessor-compatible, according to a spokesman.

Overvoltage protection is standard on the 5V models and is available as an option on all other models.

The units can be used with or without covers, depending on the nature of the application, and are convection-cooled, eliminating the need for external heat sinking or

forced air, the firm claimed.

Isolation resistance is 10M ohms and isolation voltage, input to output, is 4,000V, the spokesman added. The tracking accuracy on dual-tracking models is 3% absolute voltage difference, with a .2% change for all conditions of line, load and temperature, he said.

The power supplies are reportedly fungus-proof and have a current rating of up to 22A. A provision is included with the units for remote sensing to reduce the effect of power output lead resistance on dc regulation.

Prices for the units begin at \$75 from Lambda at 515 Broad Hollow Road, Melville, N.Y. 111746.

Second Annual Dema Meet Set for San Diego in Fall

SAN DIEGO — The Data Entry Management Association (Dema) will hold its second annual conference Oct. 30-Nov. 1 at the Sheraton Harbor Island Hotel here.

The conference theme is "Data Entry Today and Tomorrow." The gathering will concentrate on the human side of data entry and distributed data entry, according to a spokesman, and include seminars, panel discussions and workshops.

Some of the sessions will cover communication and motivation, data conversion implementation, the mixed-media environment, voice data entry, keyboarding techniques, data entry in Europe and the Middle East, data entry

incentive programs and career paths in data entry.

Other topics include applications for a data tablet; OCR — new ideas and better utilization; how to evaluate vendors; education and training of data entry personnel; programming techniques for the manager; and on-line control and management.

Dema members attending the conference will have an opportunity to participate in the organization's annual business meeting.

The conference will cost \$250 for members and \$285 for nonmembers. Team discounts are available for groups of three or more from the same company.

Additional information and registration details are available from Dema at 16E Weavers Hill, Greenwich, Conn. 06830.

Fenwal Localizes Fire Protection

ASHLAND, Mass. — A high-speed Halon 1301 fire suppression system designed to protect both large-volume areas and several contiguous areas has been introduced by Fenwal, Inc.

The central storage system is comprised of floor-mounted storage cylinders with high flow rate valves, smoke detectors, a control panel and a unique pneumatic valve-control system, according to a spokesman.

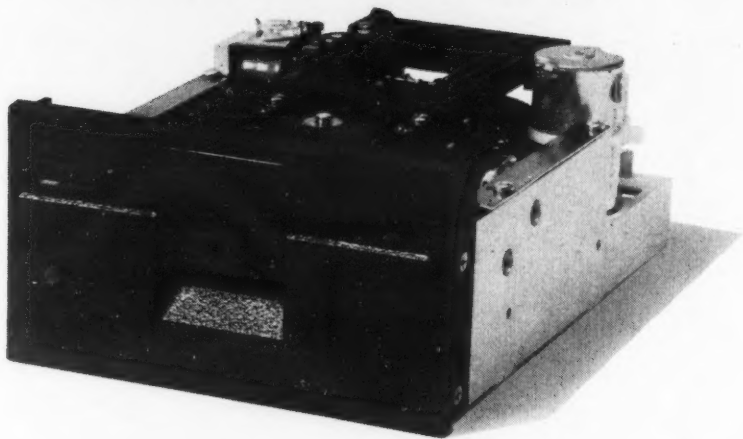
In the event a fire is detected in one of the protected areas, the system opens selector valves to provide a direct pipeline from Halon 1301 storage cylinders to the fire area. Simultaneously, the pneumatic system releases the Halon 1301 from one or more of the storage cylinders to suppress the fire, he explained.

Each Fenwal system is custom designed with computerized piping calculations to provide the correct concentration of Halon 1301 in the protected areas. A reserve system can be included to provide backup protection, the spokesman said.

Halon 1301 is an odorless, colorless, electrically nonconductive gas that has been proven an effective medium for extinguishing fires. In addition, it is not harmful to people when used as specified, leaves no residue and will not attack or react with equipment components, he noted.

Systems are individually priced, with factors including the size and shape of the facility, the number of detectors, geographic location, local fire codes and regional labor costs. Estimates are available from the firm at 400 Main St., Ashland, Mass. 01721.

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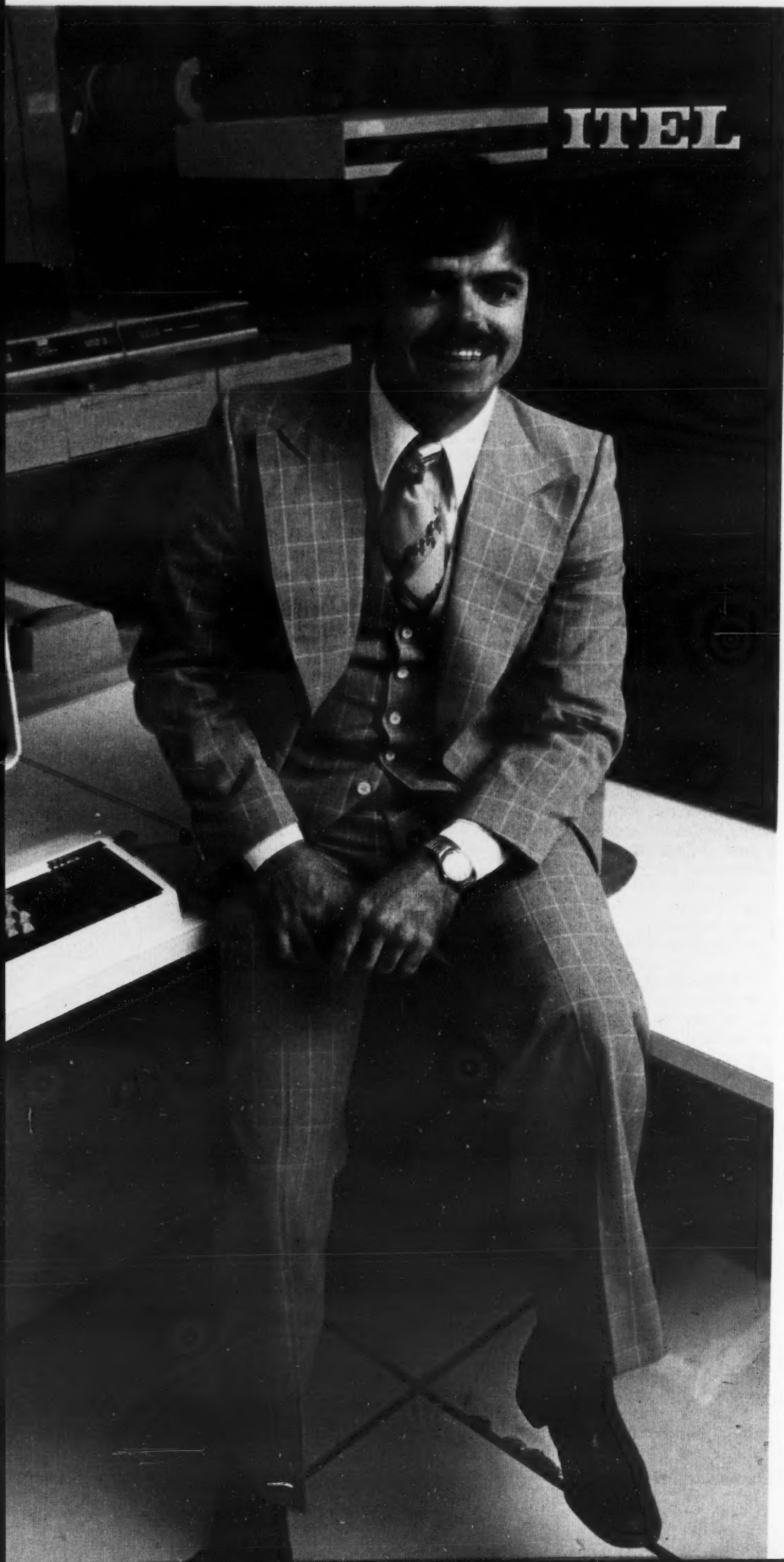
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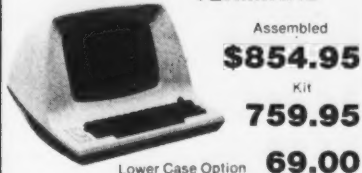
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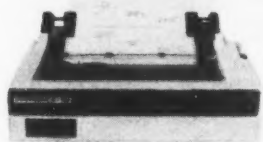
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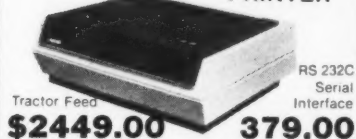
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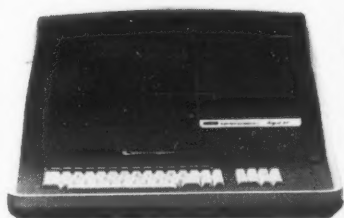


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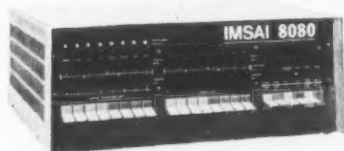
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Backup Site Planned for IBM Users

KING OF PRUSSIA, Pa. — Shared Standby Systems, Inc. (SSS) has announced it plans to construct and equip a computer backup facility here for large-scale IBM users temporarily forced out of their own installations by disasters.

The company is a wholly owned subsidiary of Shared Medical Systems, Inc. (SMS), a major processor of billing data for hospitals, and plans to be operational by July, 1979.

SSS' plans for equipment at the site currently include an 8M-byte, 12-channel IBM 3033; a mix of 7- and 9-track 800-, 1,600- and 6,250 bit/in. Model 3420 tapes; 3330 and 3350 disk drives; and 1403, 3211 and off-line 3800 printing systems.

In addition, the facility is slated to house IBM 3705 teleprocessing controllers, Model 3277 CRTs and 3284/-3286 hard-copy consoles.

Customers can make provision for obtaining special equipment, either for their own use or to be shared with other customers, SSS noted.

Software will be MVS running under JES2, a spokesman said, and will include IBM's Time Sharing Option (TSO) running under Tcam.

SSS has also made provision for backup telecommunications services. Facilities will include a 1,000 sq-ft

space containing the 3705s, a communications patch and test facility and 1,200 bit/sec telephone company line pairs in two buried cables from the central office a mile away, the spokesman said.

These pairs are said to be suitable for virtually all forms of communications, including Digital Data Service 56K bit/sec, voice-grade channels to 9,600 bit/sec and satellite terrestrial loops.

Telephone company representatives, commenting on backup facilities for nondial-up lines, particularly broadband services, stressed the need — and the costs involved — for preplanning and preinstallation of redundant facilities.

Two Client Categories

To use the service, customers must contract with SSS in advance, paying a basic monthly fee whether or not they experience a disaster. When a disaster occurs — defined by the SSS contract as any unscheduled interruption of the customer's DP service, regardless of cause, which is "reasonably" projected to last longer than 24 hours — the client can move its operations to the SSS site, paying for the actual use of machines and other supplies and equipment.

Two classes of users are recognized in the contract: a Type 1 user, who is entitled to a virtual machine allocation on the 3033 equivalent to an IBM 370/158-III and the use of 50% or less of the peripherals, and a Type 2 user, who is entitled to use of the complete system.

Type 1 users will pay a basic fee of \$3,500/mo for the right to use the facility, while Type 2 users will pay \$5,500/mo, according to the company.

To protect clients from having to compete with each other in the event of simultaneous disasters, the company will not accept two or more organizations with facilities in the same building, nor will it accept more than

80 clients.

In addition, the contract between SSS and a client establishes a procedure to negotiate the use and sharing of facilities among clients in the event of such multiple disasters.

When a client requests use of the SSS site, the contract between SSS and a client specifies, a disaster certification group will inspect the client's system or facility to verify a disaster has actually occurred. This team is made up of one SSS representative and two client representatives elected by the clients.

Although a client is entitled to move in immediately after notifying SSS it has suffered a disaster, it must leave if the disaster certification team concludes that no disaster has occurred, according to the spokesman.

The contract calls for a disaster notification fee, which the client must pay when notifying SSS of a disaster, of \$10,000, and a usage fee for Type 1 users of \$3,000 per day of occupancy. Type 2 users are billed at \$3,500 per day.

There is also a fee for false notification, set at five days' usage, regardless of customer type.

SSS includes some computer usage in its basic fees to clients. Type 1 users are entitled to 15 minutes of free CPU usage monthly, the company said, while Type 2 users get 30 minutes free monthly.

Users are also given the opportunity to test their disaster contingency plans: Type 1 users are entitled annually to six free shifts (at eight hours per shift) to test their disaster plans, while Type 2 users are entitled to nine such free shifts. Customers must provide all operational staffing during the testing.

Although no customers have yet signed contracts with SSS, the spokesman said, the firm has "12 to 15" letters of intent. Customer confidentiality is being preserved in signing customers, he added from 650 Park Ave., King of Prussia, Pa. 19406.

Static Electricity Drained by Mat

MOUNTAIN VIEW, Calif. — A conductive rubber floor mat that reportedly provides "greater conductivity, durability and other advantages" over earlier electrically conductive floor mats has been introduced by Wescorp here.

The mat was designed for use in an environment where the microcircuits in electronic equipment could be damaged by static electricity generated by an equipment operator. Operators can generate up to 50,000V, more than enough to damage or destroy a microcircuit, the firm said, noting the mat drains static electricity before it can build up to harmful levels.

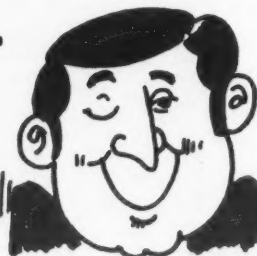
Features of the mat reportedly include flexibility, to conform to the shape of a floor; ribbing, to prevent slippage; freedom from bending or curling; rapid drainage of static charges; and thick cushioning.

A standard 4- by 8-ft Conducto Mat with a built-in snap fastener for attaching a ground strap costs \$95 from the firm at 1155 Terra Bella Ave., Mountain View, Calif. 94040. The mat is also available in rolls.



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Common Language Shared DG Extends CS Line at High, Low Ends

By Jeffry Beeler
CW Staff

NEW YORK — A family of software-compatible small business systems ranging in performance from the microcomputer to the large mini levels became available recently when Data General Corp. announced lower and upper extensions to its Commercial Systems line.

The CS/20, a low-end complement to the company's existing CS/40 family, consists of one integrated desktop model that provides performance comparable to that of an IBM 5110, according to a DG official.

The CS/60, meanwhile, consists of three models that extend upward from the CS/40 series and equal the power of a 370/138, the spokesman added.

With the earlier members of the

Commercial Systems line, the CS/20 and CS/60 models are said to form a series of upward- and downward-compatible small business systems that use an interactive version of Ansi '74 Cobol as a common programming language.

Hardware Enhancements

In addition to broadening its small systems line, DG recently announced enhancements to its CS/40 models. These hardware additions include a 50M-byte disk drive unit and a 180 char./sec printer plus 240 line/min upper and lower case printers, company officials added.

Comparing relative performance within the Commercial Systems family, a Data General official estimated that a CS/20 compiles 60 line/min to 120 line/min,



DG CS/60 Business System

compared with 300 line/min to 600 line/min for the CS/40 series and 800 line/min to 1,100 line/min for the CS/60 models.

Typical sites of CS/20 installations will include "corner retail stores," law and medical offices and other organizations with four to 25 employees and annual revenues ranging from \$100,000 to \$1 million, a DG source said.

At those locations, the desktop unit will usually serve as a stand-alone system. It can also function, however, as an intelligent data entry unit or, in larger firms, as part of a distributed processing network, company officials

explained.

By contrast, the CS/60 series — which consists of the Models 3, 5 and 6 — primarily suits large organizations, where it can serve as a dedicated or distributed system supporting as many as 12 interactive applications simultaneously, the spokesman added.

Built around a Micronova processor with 64K bytes of main memory, the CS/20 reportedly provides a 1,920-character display terminal and a movable keyboard. A maximum CS/20 configuration incorporates four 315K-byte flexible disk drive

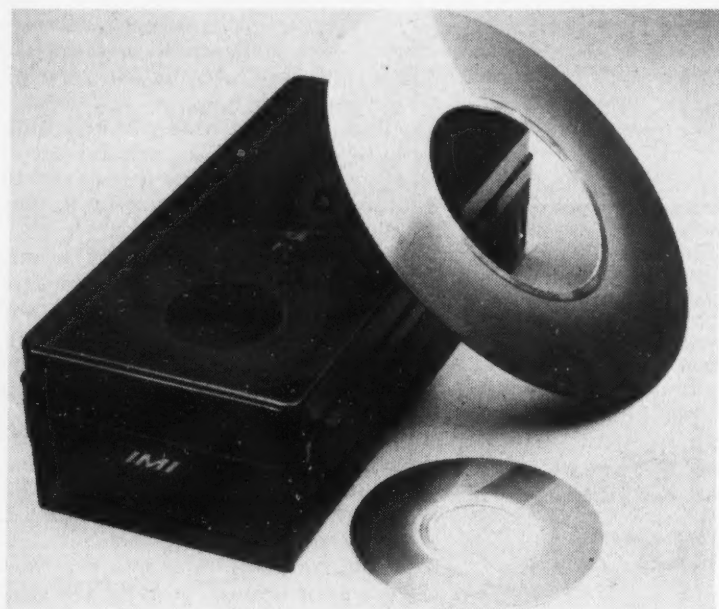
(Continued on Page 54)

Winchester Disk Unit Sports Midget Medium

CUPERTINO, Calif. — Disks almost half the size of the conventional 14-in. media have reportedly been placed in a Winchester-type storage system that fits into a standard floppy disk drive mounting aperture.

The Model 7710 uses 200mm recording media to store 11M- to 75M bytes in a 5- by 8.5-in. sealed package, according to International Memories, Inc. (IMI), the product's developer.

(Continued on Page 52)



Model 7710 Disk Drive

Spec Service Helps Users Rate, Pick Small Systems

FAIRFIELD, Conn. — Bowers Engineering Co. has announced a "packaged" specification service to help prospective users of small business systems evaluate potential vendors and choose the hardware, software and support best suited to their needs.

Bowers intends the service primarily for users who are planning to acquire their first small business computer, data collection hardware or minicomputer-based control system, company officials said. Other prospective clients of the service reportedly include users who already have medium- or large-scale systems but who are considering either automating a new application

with a mini or distributing their centralized DP workloads.

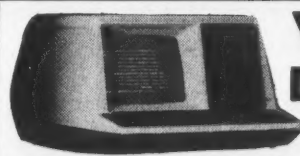
Working with a client's management and operating personnel, the service is said to cover all phases of minicomputer evaluation and selection including definition of the users' business needs, preparation of bid specifications, selection of prospective vendors, solicitation and evaluation of proposals, final vendor selection, contract negotiation and monitoring of contract performance.

The small business computer specification service is available for fixed fees from Bowers Engineering at 1214 Post Road, Fairfield, Conn. 06430.

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Digital Systems Cuts Prices On Galaxy 5 Configurations

WALKERVILLE, Md. — Price reductions averaging 22% have been announced for four of Digital Systems Corp.'s Galaxy 5 multiple-processor systems.

A Model 140 system consisting of two CPUs, a 128K-word main memory and two direct memory access (DMA) channels now costs \$55,485, according to Digital Systems officials.

A Model 150 with three processors, a 256K-word memory and three DMA channels currently sells for \$82,875, the company spokesmen said.

The price of the Model 160 configuration, which incorporates four

CPUs, a 512K memory and three DMA channels, has dropped to \$114,220, they added.

The largest member of the Galaxy 5 series — the Model 170 with four processors, 1M byte of memory and four DMA channels — now costs \$186,760, Digital Systems noted.

Spokesmen for the company credited the price cuts, which become effective immediately, to their decision to replace the 4K semiconductor random-access memory chips used in earlier Galaxy 5 models with 16K chips.

Digital Systems can be contacted at Box 396, Walkersville, Md. 21793.

LSI-11 Gets Bus Interface

AUSTIN, Texas — Measurement and test systems can reportedly be implemented on the Digital Equipment Corp. LSI-11 with an interface that connects the processor to the IEEE Standard 488-1975 bus.

National Instruments Corp.'s GPIB11V-1 interface plugs into a double-height slot and provides hardware compatibility with any LSI-11 system including the LSI-11/2, PDP-11/03 and PDP-11V/03, according to the product's developers.

Suitable in either a single- or multiple-controller environment, the interface is said to provide hardware for decoding general-purpose interface bus (GPIB) commands used to implement talker, listener and controller functions.

Support software includes drivers,

utilities, diagnostics and an interactive control program, National Instruments officials said. Users can assemble the driver program, including interrupt service routines, as a Fortran, Macro or Basic callable subroutine package for stand-alone use or as a handler under DEC's RT-11 operating system, the spokesman added.

Because the driver and utility programs use the same call syntax as National Instrument's GPIB11-1 interface for the DEC PDP-11, a PDP-11 user can reportedly run GPIB programs with either a PDP-11 or an LSI-11.

An interactive control program with the interface aids debugging and instrument checkout, company officials reported.

The product costs \$695. It is also available in quantity discounts from National Instruments at 8330 Burnet Road, Austin, Texas 78758.

Unit Sports Midget Medium

(Continued from Page 51)

Intended for small business systems that otherwise would use 14-in. Winchester-type disks or multiple floppy disk drive units, the Model 7710 is said to incorporate four oxide-coated recording surfaces. Three of those surfaces store user data, while the fourth holds prerecorded information for the drive's track-following servo system, IMI officials said.

The disks, which rotate at 3,600 rev/min, store 5,868 bit/sec and provide 350 track/surface with 300 track/in., the spokesman noted.

The drive unit itself transfers 648k byte/sec and accesses in an average of 50 msec with 8.3 msec latency and 10 msec track-to-track access times, they added.

A linear voice-coil actuator reportedly positions the unit's standard Winchester-type read/write heads, and a brushless dc motor drives both the spindle and a closed-loop, filtered air system that protects the disks, actuator and heads.

The Model 7710's controller, meanwhile, incorporates a Signetics, Inc. 8X300 bipolar microprocessor and fits on a 7- by 10-in. printed circuit board in the drive's base, IMI said.

The controller interfaces to a host processor through an IEEE 488 standard bus and to the disk drive through a disk bus consisting of 24 signal lines.

Prices for a standard Model 7710 range from \$1,500 to \$2,900 in OEM quantities. Without a controller, the unit costs less than \$2,000; with an optional, built-in controller it is priced at about \$3,000.

IMI is located at 10381 Bradley Drive, Cupertino, Calif. 95014.



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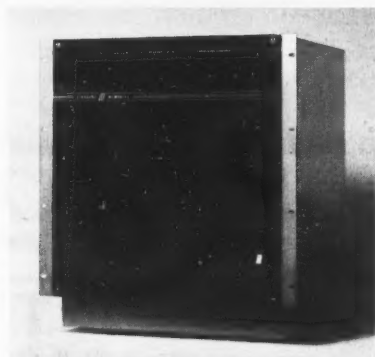
The chassis can hold eight memory modules providing a maximum storage capacity of 1 million words (2 Mega-

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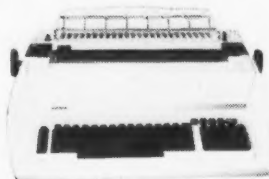
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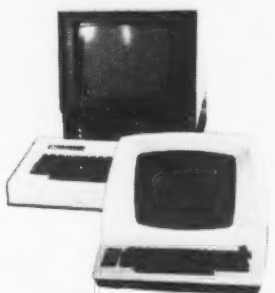
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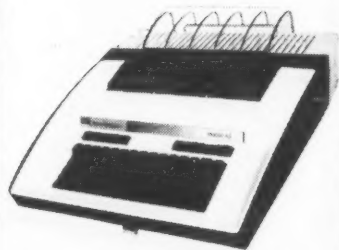


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For Chemical Products Firm Minis Serve Field Offices Abroad

DALLAS — Unable to centralize DP operations at its European field offices, a specialized chemical products maker based here has opted for the next best alternative — a distributed processing network built around a series of mini-computers.

Officials at National Chemsearch Corp. credit the distributed network with speeding order reporting and accounting procedures at its international field offices. They also credit the system with supplying the firm's top executives with the information they need to accurately assess domestic and international market conditions.

In the network, the computers provide National Chemsearch with on-site DP support for general business processing tasks like order entry, accounts receivable and cash monitoring. Raw data from the company's international sales representatives enters the minis, two of which serve as central processors at the firm's European branch offices, through a series of on-line workstations.

The data first undergoes some initial "massaging" and then is fully processed by the computers at the end of each working day. From the resulting information, an IBM 370/148 at the company's European headquarters

generates month-end summary reports.

Because Chemsearch and its subsidiaries sell their products to customers throughout the world, fast and reliable DP has always been a top priority for the company, sources here said.

Moreover, the market that Chemsearch deals in is characterized by a high volume of relatively small orders generated by many field sales representatives. As a result, Chemsearch must maintain very detailed accounting and billing records in addition to a substantial inventory, company officials explained.

Domestic Operations

In its domestic operations, Chemsearch's accounting and data communications programs are highly centralized, with all field facilities transferring data directly to an IBM 370/148 at company headquarters here. By standardizing its accounting routines, the firm has minimized the amount of on-site processing performed by its U.S. branch offices.

All raw sales data goes here for processing on the central mainframe, after which it returns to the branch offices for order filling and shipping. At the end of the processing cycle, the system

generates management reports for the field locations and summary accounting reports for distribution in the corporate headquarters.

In Europe, however, a welter of bewildering government and business regulations have made centralized operations impractical and, in some instances, impossible, Chemsearch spokesmen explained.

To cope with these conflicting requirements, the company instead began planning a distributed processing network that not only would extend data entry and DP capabilities across national borders but would also communicate with its central computer systems either here or at its European headquarters.

After months of consultation and evaluation, the firm chose Datapoint Corp. batch transaction and time-sharing systems over the rival configurations it considered. Company officials opted for the Datapoint equipment in part, they said, because it posed no serious user training problems and because its business programming language proved relatively easy to implement.

Built around 48K-byte Model 5500 business processors, the network incorporates a series of Datapoint's 1,920-character Model 3600 workstations with hardwired connections to the CPUs. The workstations typically serve as data input terminals for source data being transferred to the CPUs' cartridge disk systems, a company official said.

One of the data entry and processing systems operates at Chemsearch's European headquarters, while several of the company's subsidiaries are similar configurations to receive mail reports and orders that are processed at shipment sites throughout the continent, corporate officials said.

In the near future, Chemsearch plans to install additional data entry and processing systems elsewhere in Europe as well as in Latin America, the spokesmen added. Three of these upcoming systems will communicate directly with the company's central mainframe here through intercontinental phone lines.

Disk System Emulates RK-11

SMYRNA, Ga. — Single-board control is reportedly available with an LSI-11/PDP-11/03-compatible disk system from Equipment Resources, Inc.

The Model ER1010 provides 5M bytes of fixed disk plus 5M bytes of removable storage, emulates the Digital Equipment Corp. RK-11 disk system and plugs into the two DEC processors through one quadslot board, according to Equipment Resources officials.

Transparent to DEC's RT-11 operating systems, the disk system also has a built-in power supply, occupies 8.75 in. of vertical rack space and can be temperature-stabilized 90 seconds after a cold start, the spokesmen added.

An off-the-shelf model with cabling and formatted disk pack costs \$6,900 from Equipment Resources at 1175-4 Fleming St., Smyrna, Ga. 30080.

Users Get Selection Assist

(Continued from Page 51)

units and a 60 char./sec Dasher TP1 printer, DG officials said.

The desktop unit is also said to provide a 4,800 bit/sec communications option with 2780 and 3780 communications capability.

The CS/60 series models, meanwhile,

offer an assortment of configurations based on the Eclipse S/130, company spokesmen said. A Model 3 configuration incorporates a 64K-byte CPU, 20M- to 80M bytes of cartridge disk storage and one to four interactive terminals, they added.

Model 5 supports a 128K-byte processor, 20M-byte disk unit and as many as 17 terminals, while the Model 6 accommodates up to 256K bytes of main memory, 17 terminals and a choice of 50M, 96M- or 190M-byte diskette unit, a DG official said.

Like the CS/20, the three CS/60 models come with a synchronous communications option, though it operates at twice the speed of the smaller system's option, the official noted.

Software for both the CS/20 and the CS/60 series provides interactive screen handling extensions, Isam file management and system utilities, DG said. In addition, the CS/60's software includes enhancements like multiple-terminal support capability, linkages that pass data to called programs and the availability of four alternate keys for Isam file management, the company added.

A basic CS/20 configuration with 64K bytes of MOS memory, two 315K-byte flexible disk drive units and a display terminal with keyboard costs \$10,945.

A typical CS/60 Model 6 configuration with 256K bytes of main memory, an 800/1,600 bit/in. tape drive, 380M bytes of disk storage, eight interactive Dasher display terminals, an 180 char./sec Dasher LP2 bidirectional printer, a 300 line/min printer, RJE80 communications capability and Hasp II workstation support costs \$151,920.

Volume deliveries of both the CS/20 and CS/60 are scheduled to begin in September from DG at Route 9, Westboro, Mass. 01581.

Intel to Lease DG CS/20, 60

NEW YORK — Hardware, software, maintenance and financing for Data General Corp.'s CS/20 and CS/60 series became available from a single source when the company recently signed Intel Corp.'s Business Systems Division as a nationwide third-party distributor for the small business systems.

Through its 45 sales representatives in 10 cities, the Intel division will lease the equipment to customers whose annual revenues range from \$50,000 to \$25 million, division president Stephen Gerbsman explained. Intel, which had earlier gained distribution rights to DG's CS/40 line, will also supply the CS/20 and CS/60 to major hardware wholesalers and to distributed systems users among the nation's Fortune 1,000 firms, Gerbsman said.

By leasing from Intel, users will be able to tap the library of application software the company has developed for some 15,000 customers in industries like distribution, manufacturing, banking, insurance, finance and communications.

Mini users will also reportedly be able to perform their applications off-line in the company's regional data centers.

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- What to See
- Who'll Be There

300 Exhibitors Signed Up More Than 40,000 Expected to Swamp NCC

By Marcia Blumenthal
CW Staff

ANAHEIM, Calif. — An estimated 40,000 visitors and 300 exhibitors are expected to flock to the Anaheim Convention Center for the 1978 National Computer Conference opening June 5.

To accommodate the multitude of booths and the mammoth crowds, part of the parking lot adjacent to the Convention Center was enclosed, carpeted and air-conditioned. But that space was still not adequate so the personal computer exhibits will be housed at the nearby Disneyland Hotel.

The role of computers in helping alleviate the national energy problem will be the conference theme, unifying all the keynote sessions.

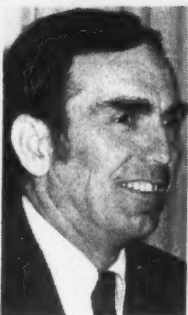
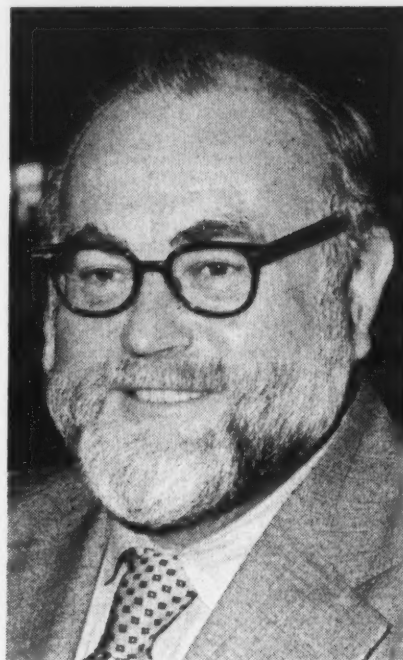
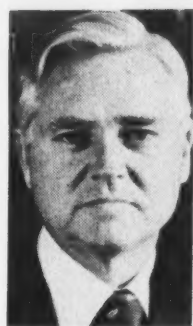
Democratic Sen. Ernest F. Hollings of South Carolina and Dr. Joel A. Snow, associate director for research and policy for the Office of Energy Research in the U.S. Department of Energy, will be the keynote speakers at the opening plenary session on Monday, June 5 at 9:30 a.m.

Hollings has been active in formulating energy policy in the Senate, and he currently serves as chairman of the Senate Subcommittee on Communications. Snow will speak on the application of computers to research programs being undertaken by the Department of Energy.

Luncheon Speakers

Several other speakers are scheduled to address various luncheons and sessions throughout the week. On Tuesday, June 6, Harold J. Haynes, chairman of the board and chief executive officer of Standard Oil Co. of California, will assess the current energy crisis and describe proposed industry solutions to the energy problem. He will also outline some approaches to more efficient utilization of existing energy resources.

At the conference luncheon on Wednesday, Dr. Theodore J. Williams,



Shown clockwise from left are Sen. Ernest F. Hollings, Dr. Joel A. Snow, Dr. Stephen W. Miller (center), Dr. Cuthbert C. Hurd, Harold J. Haynes, Dr. Leonard Y. Liu, Dr. Sakti P. Ghosh, Dr. Theodore J. Williams and Ryal R. Poppa.

president of the American Federation of Information Processing Societies, Inc. (Afips), the NCC sponsor, will assess the growing importance of hierarchical and distributed computer systems in industrial process monitoring and control, with special emphasis on their importance in conserving existing energy resources.

"Such control systems will be absolutely necessary in coordinating plant operations to permit the maximum productivity with the minimum of energy usage," Williams believes.

Besides his Afips post, Williams is professor of engineering and director of the Purdue Laboratory for Applied Industrial Control at Purdue University.

Ryal R. Poppa, chairman of the board of Pertec Computer Corp., will be the featured speaker at the conference's Personal Computing Luncheon. Poppa will explore the

trend toward the widespread use of personal computers to manage energy in the home and in business.

Lively Symposium Expected

A special symposium on "Developing Energy and Computing Technology," chaired by Dr. Cuthbert C. Hurd, will be held Tuesday at 8:30 p.m. Hurd, a computing science pioneer and an entrepreneur in the energy field, noted NCC '78 is the first time the conference has a unifying theme.

According to Hurd, speakers at that symposium from industry, government, finance and other disciplines will evaluate the keynote addresses made during the first two days of the conference.

Expecting the symposium to be a lively event, Hurd predicted debate

will center on criticism of private industry for not doing enough to help solve the energy problem.

Hurd estimated it will take about \$100 billion to develop the kinds of energy resources and companies needed to relieve the energy problem over the next 25 years. He compared this new challenge to that met by the computer industry, which has become a \$100 billion industry during the past 25 years.

With the same willingness to invest, an energy industry to alleviate the energy crunch will surface.

Under the direction of NCC chairman Stephen W. Miller, the conference is expected to draw 40,000 people and will feature about 100 technical sessions and exhibits by 300 organizations.

Miller, manager of program development in the Information Science and Engineering Division of SRI International, was pivotal in arranging the 1975 NCC in Anaheim, which marked an all-time record in total paid registrants and exhibitors.

As of May 17, preregistrations for this year's conference stood at 1,800 compared with 1,400 at the same time last year, according to Afips, which also reported that total attendance last year topped 36,500 people.

Dr. Leonard Y. Liu, director of systems architecture and standards for IBM, is a program co-chairman, responsible for the overall planning and implementation of the professional program for NCC.

The second co-chairman, Dr. Sakti P. Ghosh, a senior research staff member in the Computer Science Department of IBM Research laboratory, is coordinating all activities planned by the program committee.

In addition to the keynote sessions, technical sessions and exhibits, special events such as the awarding of the 1978 Harry Goode Memorial Award have been scheduled. This year the award will be shared by Dr. Gordon E. Moore and Dr. Robert N. Noyce, president and chairman of the board, respectively, of Intel Corp.

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Anaheim, Here We Come

A Bit of History

ANAHEIM, Calif. — This city, host of the 1978 National Computer Conference, was settled in 1857 by German colonists who were looking for a place to grow wine grapes.

A blight in the late 1800s wiped out the burgeoning wine industry, however, and led to the cultivation of oranges in their place, turning the area into a bustling citrus center.

But all that changed in 1955, when Disneyland opened its gates, bringing tourism to the forefront of local industry.

When Disneyland opened, there were only five hotels and two motels in the area — with a total capacity of 87 rooms. Now there are more than 130 hotels and motels with more than 10,000 rooms.

With the tourism boom, the city built Anaheim Stadium, where the California Angels baseball team plays, in 1966 and a year later opened the Anaheim Convention Center, which the city claims is the largest on the West Coast.

Anaheim has changed considerably from the time when the original surveyor described it as "27 miles southeast of Los Angeles on the crossroads of wagon trails between San Pedro, San Bernardino and Salt Lake City."

Eats: Snacks to Gourmet

ANAHEIM, Calif. — Anaheim boasts no fewer than 230 restaurants, according to the city's visitor and convention bureau. Among them are a host of familiar U.S. chains and fast food outlets such as Howard Johnson's and McDonald's, so no one need starve.

Since their familiar marquees will attract interested NCCers, those eateries are not listed in the restaurant guide, which begins on Page P/6.

The area offers a wide variety of other spots — mostly informal — regardless of your mood or budget. They range from a quick snack to a gourmet dinner and specialize in American, French and conti-

nental, Italian, Mexican and Spanish, Oriental, smorgasbord and sea foods.

To be sure of a table, reservations are recommended.

The Overland Stage and Territorial Saloon, with a hefty selection of entrees and an excellent salad bar, deserves a star. The Overland is right at the Inn at the Park on S. Harbor Blvd. in Anaheim.

For more adventurous souls — or those with time enough to drive half an hour or so — both Newport Beach and Laguna Beach offer some delightful alternatives.

Worthy of special mention is the Pleasant Peasant at McArthur Square in Newport Beach, which serves moder-

ately priced, French-style food. Also in Newport Beach is Ambrosia — a more expensive but lovely spot.

Those with a yen for Italian food might want to try the Villa Nova on the Pacific Coast Highway in Newport.

Another Italian spot that gets raves from the local residents is Matteo's at Pacific Coast Highway and McArthur, also in Newport Beach.

Gulliver's, which features English-style rib roasts and steak and kidney pie and is located across the street from the Orange County Airport, also is highly recommended.

For seafood, the Crown House at Pacific Coast Highway and Crown Valley Parkway in Laguna Beach is a favorite with locals. Delaney's is another, with restaurants in Newport, El Toro and Anaheim.

And for an "exotic" experience, try the Marrakesh, on West Coast Highway, also in Newport Beach.

For those who dream of crispy tortillas and the heat of Jalapeno peppers, some of the best of the California variety are found in and around Anaheim. The Red Onion, at 1801 Katella Ave., in Anaheim, is a good place for them.

In nearby Santa Ana, Villa Taxco on East First St. also is recommended.

Fun, Sightseeing Minutes Away

ANAHEIM, Calif. — While Disneyland is the main entertainment attraction here, Anaheim and the surrounding area also boast a number of other theme parks and other entertainment opportunities. A car is best to reach them, but bus tours are offered daily.

Anaheim, has become one of the meccas of vacationers since Disneyland opened in 1955. The area also boasts such attractions as Knott's Berry Farm, the Movieland Wax Museum and Lion Country Safari.

For the more peripatetic, there are of course all the attractions of Los Angeles to the north and San Diego to the south, while the border towns of Mexico a bit further down the coast also beckon.

In addition to the theme parks located close to Anaheim itself, the Pacific Coast is just 12 miles to the west, where the delightful towns of Newport Beach and Laguna Beach can be found.

Among the theme park attractions, Knott's Berry Farm is probably the best known outside of Disneyland itself.

This 150-acre amusement park originally was a rhubarbs and boysenberry farm, but during the Depression Walter and Cordelia Knott began serving chicken dinners in their home in order to make ends meet.

That venture grew into an amusement complex which now features more than 100 different rides and attractions, including a narrow-gauge railroad and an Old West ghost town with the "Timber Mountain Log Ride."

There are several Old West stores, a saloon and a jail in

this part of the park, and outlaws and good guys have a several-times-a-day shootout on the main street while can-can dancers entertain in the saloon.

The more modern part of the park is designed around a Roaring '20s theme and features such rides as a double-loop corkscrew rollercoaster, a parachute drop and flying airplanes.

A '20s car display is also featured and there is entertainment in the Good Time Theater, the Cloud Nine Ballroom and the Starlight Pavilion.

Rounding out the park is the Fiesta Village, where visitors can stroll along the Mission Trail, make purchases in the open stall market or just relax by the Flamingo Pond — all accompanied by mariachi music.

Also in the villages are such rides as the "Tijuana Taxi," the "Happy Sombrero" and the "Mexican Whip."

Knott's is presently operating on spring hours, meaning it is open from 10 a.m. to 6 p.m. weekdays, 10 a.m. to 11 p.m. on Friday and Saturday and 10 a.m. to 9 p.m. on Sunday. Straight admission is \$4.25 and admission plus a 10-ride book of tickets costs \$5.95.

About 13 miles south of Disneyland, in Irvine, visitors can safari through lion country. But there are more than just lions at Lion Country Safari, since park residents include elephants, rhinos, cheetahs, giraffes, zebras, hippos and African antelope plus ostriches and exotic birds.

Visitors drive their own cars through the park among the animals or take a river ride or a train through the junior part of the park.

Dining at the park's restaurant or picnicking in a forest grove is possible.

The admission runs \$4.95 for adults and \$2.95 for children, with those four years and younger getting in free. The park is open from 9 a.m. to 6 p.m.

Right next door to Knott's Berry Farm and 10 minutes from Disneyland, visitors will find the Movieland Wax Museum in Buena Park.

The museum has models of

more than 238 movie stars in 83 movie scenes on display. It is open from 9 a.m. to 10 p.m. weekdays, but stays open to 11 p.m. on Friday and Saturday.

And if you get the time, the Queen Mary is docked at Long Beach Harbor. Built in 1936, the Queen is described as "art deco opulent." Take the Long Beach freeway to the Queen Mary Exit. The ship is open for tours daily from 10 a.m. until 6 p.m.

Disneyland: Fantasy Trip

ANAHEIM, Calif. — While many National Computer Conference attendees may feel that "Fantasyland" is on the floor of the Convention Center here, it's really just up the street — along with six other theme areas that make up Disneyland.

The park, which has entertained more than 165 million visitors since it opened 23 years ago, consists of 76.6 acres of rides and entertainment surrounded by another 107.3 acres of parking space and is connected to the Disneyland hotel on one side.

The park was built in one year at a cost of \$17 million. When it opened in 1955, it featured 22 rides in five different lands. Since then, however, the amount invested has risen to \$188 million and there are now more than 50 attractions.

Nostalgia inspired Main Street, U.S.A., the first land visited by arriving guests. Here is an idealized composite of the nation's small towns as they were at the turn of the

century. It's the era when the gas lamp was about to be extinguished by its electric successor.

Main Street is the avenue leading to all Disneyland adventures. It is flanked by a tribute to its founder, "The Walt Disney Story," which features "Great Moments with Mr. Lincoln," and an old-fashioned emporium and Main Street Station, the boarding point for the grand circle tour of the park on the four trains of the Disneyland Railroad.

The next stop is Adventureland, featuring the mysterious corners of Asia and the South Seas.

Nestled in a vine-covered South Seas Island hut, 225 loquacious birds, multihued flowers and tiki gods are brought to life through "Audio-Animatronics" for a musical serenade in the Enchanted Tiki Room.

Nearby, you can board boats for a journey through the murky, crocodile-infested waters of the jungle cruise.

Oblivious to the jungle

nearby, guests climb to the lofty Swiss Family Treehouse, commune of the shipwrecked family, while in a bustling bazaar nearby, shoppers may purchase products and gifts from around the world.

Iron-trellised balconies, narrow winding streets, sidewalk cafes, an assortment of shops, wandering Dixieland jazz minstrels, a haunted house and an adventure on the Spanish Main are the ingredients of New Orleans Square.

By boarding bayou bateaux (boats), guests sail into an era when pirates ruled the high seas. A band of buccaneers plunder and burn a city during the conclusion to the "Pirates of the Caribbean" adventure, another "Audio-Animatronics" presentation.

Situated on the outskirts of the Square is Disneyland's Haunted Mansion, inhabited by 999 ghosts, ghouls and goblins who carry on an incessant search for Occupant No. 1,000.

Plying the Rivers of America
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2:00-3:40

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8:15-9:55

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3:50-5:30

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PROFESSIONAL DEVELOPMENT SERIES			
Business Protection from Computer Crime and Accidental Loss Dann B. Parker, SPI International			
Cryptographic Protection in Computer Systems Principal Instructor: Richard E. Lennon, Systems Communications Division, IBM			
Designing the Database System Project Leo J. Cohen, Performance Development Corporation			
Hands-On Microcomputer Software/Hardware Workshop Eric R. Garen, Integrated Computer Systems, Inc.			
Software Design Techniques: Structured Methodology — Truths and Fallacies Gopalik Kapur, Kapur & Associates, Inc.			

CONFERENCE AT A GLANCE

The 1978 National Computer Conference will feature an unparalleled array of program sessions, featured addresses, plus a special symposium on computing and energy. The role of computers in helping to alleviate the national energy problem will be a major theme of NCC '78. On opening day, prominent members of the Administration are expected to assess energy problems and issues. Then on Tuesday, June 6, Harold J. Haynes, chairman of Standard Oil Company of California, will analyze the current energy situation and proposed solutions by industry. That evening Dr. Culbert C. Hurd, a computer pioneer and energy entrepreneur, will chair a special Symposium on Developing Energy and Computing Technology.

Wednesday, June 7, will feature an AFPS Presidential Address by Dr. Theodore J. Williams with emphasis on the role of computerized industrial process monitoring and control systems in achieving minimum energy usage. The following day, June 8, Ryal R. Poppa, chairman of Perlec Computer Corporation, will discuss trends in personal computing including how expected advances in hardware and software may contribute to improved management of home and business energy systems.

OPENING PLENARY SESSION 9:30 a.m., Monday, June 5
Leading members of the Administration will assess Computers and Energy

INDUSTRY LUNCHEON 12:00 noon, Tuesday, June 6
Featured Speaker: Harold J. Haynes, Chairman of the Board and Chief Executive Officer, Standard Oil Company of California

ENERGY SYMPOSIUM 6:30 p.m., Tuesday, June 6
Developing Energy and Computing Technology.
Chairman: Dr. Culbert C. Hurd, a computer pioneer and energy entrepreneur

CONFERENCE LUNCHEON 12:00 noon, Wednesday, June 7
Featured Speaker: Dr. Theodore J. Williams, President, The American Federation of Information Processing Societies, Inc.

PERSONAL COMPUTING LUNCHEON 12:00 noon, Thursday, June 8
Featured Speaker: Ryal R. Poppa, Chairman of the Board and Chief Executive Officer, Perlec Computer Corporation

MONDAY A.M.

OPENING PLENARY SESSION
9:30 a.m., Monday, June 5
Leading members of the Administration will assess Computers and Energy

MONDAY P.M.

2:00-3:40 3:50-5:30

CALIFORNIA I

HOME & HOBBY COMPUTING

The Current Situation & the Forseeable Future
Jim C. Warren, Jr.

CALIFORNIA II

COMPUTER MODELS IN SOLVING WORLD'S ENERGY PROBLEM

Energy Decision Analysis
Robert Korsan

CALIFORNIA IV

DATA PROCESSING MANAGEMENT & ADMINISTRATION

Time Management for the DP Professional
James F. Iowen

ORANGE COUNTY 18

DATABASE MANAGEMENT SYSTEMS

Distributed Database Technology
Robert W. Ioylor

SANTA ANA I

DATA NETWORKS

International Data Networks
Barry Wessler

SANTA ANA II

DESIGN AUTOMATION & COMPUTER GRAPHICS

Computer Aid for Automatic Layout of Integrated Circuit Masks
Charles W. Gwyn

GARDEN GROVE III

PERFORMANCE MEASUREMENT & EVALUATION

Mathematical Analysis of Computer Performance
Hisashi Kobayashi

ANAHEIM

OFFICE AUTOMATION ARCHITECTURE

Word Processing: A Revolution or an Evolution?
Evelyn Barazin

CONFERENCE RECEPTION

6:30 p.m.
Grand Ballroom
Disneyland Hotel Convention Center

GENERAL INTEREST SESSIONS

Monday, June 5 through Thursday, June 8
1:30 p.m. and 3:30 p.m.
Special sessions of interest to family members.
Disneyland Hotel

Separate Registration Will Be Required For Each Seminar

TUESDAY A.M.

8:15-9:55 10:05-11:45

TUESDAY P.M.

2:00-3:40 3:50-5:30

COMPUTER ARCHITECTURE

LEGISLATION & ITS IMPACT

Computer Crime
Donn B. Parker

Impact of Semiconductor Technology on Computer Architecture
Gordon Moore

Architecture Evolution I
Samuel H. Fuller
Daniel E. Siewiorek
C. Gordon Bell

DESIGN AUTOMATION

Machine Design Automation Systems
Waldo Magnusson, Jr.

Peripheral & Multi-processors in Simulation
Walter J. Karplus

Microprogramming & Simulation
Gary J. Nutt

PROGRAMMING & OPERATING SYSTEMS

Protection in Operating Systems
R. Stockton Gaines

History of Programming Languages
Jean E. Sammet

COBOL - A Status Report
Paul Oliver

DATABASE MANAGEMENT SYSTEMS

Data & Program Conversion
Alan Marten

Programming Language Interfaces to DBMS
Sham Navathe

Legal Aspects of Software Protection
Michael S. Kaplinger

DATA NETWORKS

International Computer Communications Regulations
George J. Ussondrello

Satellite Data Communications for Public Service Sector
John Witherspoon

Hardware Architecture for Office Automation
Larry J. Little

COMPUTER MODELS IN SOLVING WORLD'S ENERGY PROBLEM

Computers in Oil Exploration
Pierre L. Goupilaud

Energy Modeling Panel
William F. Rousseau

Computer Performance Technologies
Stephen R. Kimberlin

HOME & HOBBY

Computers for the Mass Consumer Market
David A. Lien

Computers & Their Applications
Kimito Ibusaki

Computer Performance Technologies
Stephen R. Kimberlin

RECENT PROGRESS IN JAPAN

Overview of Recent Progress in Japan I
Toru Mikami

Overview of Recent Progress in Japan II
Toru Mikami

INDUSTRY LUNCHEON

12:00 noon, Tuesday, June 6
Featured Speaker: Harold J. Haynes, Chairman of the Board and Chief Executive Officer, Standard Oil Company of California

Developing Energy and Computing Technology.
Chairman: Dr. Culbert C. Hurd, a computer pioneer and energy entrepreneur

ENERGY SYMPOSIUM

6:30 p.m., Tuesday, June 6
Developing Energy and Computing Technology.
Chairman: Dr. Culbert C. Hurd, a computer pioneer and energy entrepreneur

PROFESSIONAL DEVELOPMENT SERIES

An Overview of Word Processing
Amy D. Wohl, Datapro Research Corporation

Women and Management Update - Skills for Winning With Dr. Dru Scott, Dru Scott Associates, Inc.

How to Get Started With Microcomputers
Eric R. Goren, Integrated Computer Systems, Inc.

CONFERENCE LUNCHEON

12:00 noon, Wednesday, June 7
Featured Speaker: Dr. Theodore J. Williams, President, The American Federation of Information Processing Societies, Inc.

Developing Energy and Computing Technology.
Chairman: Dr. Culbert C. Hurd, a computer pioneer and energy entrepreneur

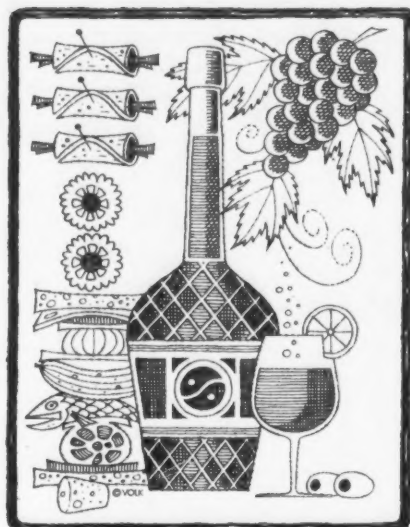
Personal Computing Lunch
Donn L. O'Neill, Ph.D., National Learning Institute, Inc.

GENERAL INTEREST SESSIONS

Monday, June 5 through Thursday, June 8
1:30 p.m. and 3:30 p.m.
Special sessions of interest to family members.
Disneyland Hotel

Separate Registration Will Be Required For Each Seminar

Restaurants



AMERICAN

Anaheim Depot Restaurant. 991-1970. 1055 W. Ball Road, Anaheim, MC, BA, AE.
Anaheim Hyatt House. 772-5900. 1700 S. Harbor Blvd., Anaheim. All major credit cards.
Anaheim Stadium Club Restaurant. 634-9001. 2000 S. State College Blvd., Anaheim.
The Cannery Restaurant. 675-5777. 3010 Lafayette Ave., Newport Beach. BA, MC, AE.
Carl's Charboiler Family Restaurant. 774-1680. 1168 W. Katella Ave., Anaheim. BA, MC.
Carl's Jr. Restaurant 638-9790. 2119 S. Harbor Blvd., Anaheim.
Chalet Pancake & Steak House. 533-3387. 721 W. Katella Ave., Anaheim. BA, MC.

MDB gets your IBM Series/1 together with more than 30 different line printer models, over 100 different terminals (TTY/RS232 type), or wire wrap for your special requirements.

MDB interfaces provide peripheral variety for the IBM Series/1 computer system. No longer limited to the manufacturer's models, you can select from the almost unlimited peripheral devices available in the minicomputer market. User flexibility is the benefit of MDB interface products.

The MDB Line Printer Controller for IBM Series/1 computers gives total printer capability with no change in system software. Microprocessor controlled, the interface allows maximum data transfer to any printer. The single board module operates in cycle-stealing mode or under Direct Program Control; character code and transfer belt conversion is available to match any printer.

The MDB Serial Interface Board provides user flexibility in attachment of the Teletype or equivalent device to the Series/1 computer. This board also permits use of any CRT or similar device through use of RS232 circuitry. The TTY board has RS232, 422, and 423, as well as current loop modes of operation. It is double buffered to minimize data over-run; baud rates of 50 to 19.2K are switch selectable.

Unique interface design requirements are facilitated by the WW72 and WW64 wire wrap boards for Series/1 computers. Up to 72 twenty-pin or 64 sixteen-pin IC posi-

tions are available respectively; numerous other IC size combinations can be developed by the user. These boards include pins in the user wirewrap portion with pads provided for discrete components. The MDB boards can accommodate any .300, .400 or .600 center dual in-line packages; two 40-pin ribbon-cable edge connectors are provided.

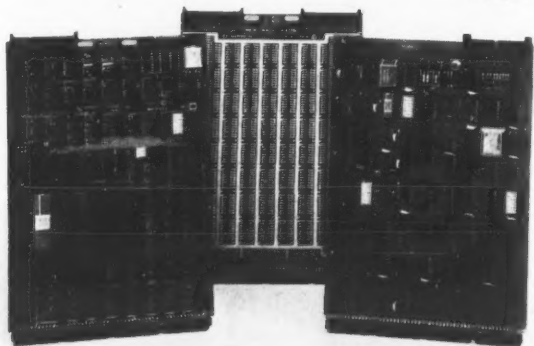
MDB interface products always equal or exceed the host manufacturer's specifications and performance for a similar interface. MDB interfaces are completely software transparent to the host computer. MDB products are competitively priced, delivery is 14 days ARO or sooner.

MDB places an unconditional one year warranty on its controllers and tested products. Replacement boards are shipped by air within twenty-four hours of notification. Our service policy is exchange and return.

MDB also supplies peripheral device controllers, GP logic modules, systems modules and communications/terminal modules for DEC PDP-11 and LSI-11*, Data General and Interdata computers. Product literature kits are complete with pricing.

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Orange, California 92665
714-998-6900
TWX: 910-593-1339

*TM Digital Equipment Corp.



Chao's Chinese & American Restaurant. 776-1880. 1560 S. Harbor Blvd., Anaheim. All major credit cards.

Charley Brown's. 634-2211. 1751 S. State College Blvd., Anaheim. AE, MC, BA.

Crescendo. 956-1410. 1721 S. Manchester, Anaheim. BA, AE, MC.

Gulliver's. 833-8411. 18482 McArthur Blvd., Irvine.

Grand Hotel. 772-7777. #1 Hotel Way, Anaheim. AE, CB, DC, MC, BA.

Hamburger House. 535-0222. 1770 S. Harbor Blvd., Anaheim. BA, MC.

The Inn at the Park. 750-1811. 1855 S. Harbor Blvd., Anaheim. AE, BA, CB, MC.

Jolly Roger Inn. 772-2722. 620 W. Katella Ave., Anaheim. BA, MC, DC, CB, AE.

Knott's Berry Farm Restaurants. 827-1776. 8039 Beach Blvd., Buena Park. BA (Visa), MC.

Lindel's Restaurant-Delicatessen-Bakery. 772-9210. 1783 W. Lincoln Ave., Anaheim. BA, CB, DC, MC.

Longfellow's - The Chicken, Steak and Chocolate Cake Place. 634-4905. 710 E. Katella Ave., Anaheim. AE, DC, CB, MC, BA, Visa.

Loose Caboose. 634-9565. 801 E. Katella Ave., Anaheim. BA, MC, DC, CB.

Marri's Pizza. 533-1631. 1194 W. Katella Ave., Anaheim.

Plush Fox Inn. 956-3250. 950 Ox Road, Anaheim. All major credit cards.

Sheraton-Anaheim. 778-1700. 1015 W. Ball Road, Anaheim. All major credit cards.

Slender Touch Dieter's Restaurant. 533-3204. 1671 W. Katella Ave., Anaheim.

Taurean Inn. 691-0801. 660 N. Beach Blvd., La Habra. All major credit cards.

Tom Jones Ltd. 633-3280. 512 E. Katella Ave., Orange. AE, BA, CB, MC.

BUFFET/SMORGASBORD

Hansa House Smorgasbord. 750-2411. 1840 S. Harbor Blvd., Anaheim. BA, MC.

CONTINENTAL/FRENCH

Ambrosia. 673-0200. 501 30th St., Newport Beach. All major credit cards.

Chantclair. 752-8001. 18912 Mac Arthur Blvd., Irvine. AE, CB, DC, BA, MC.

Chez Cary Restaurant. 542-3595. 571 S. Main St., Orange. All major credit cards.

La Fayette Restaurant. 537-5011. 12532 Garden Grove Blvd., Garden Grove. BA, AE, CB, MC.

Petite Auberge. 556-0556. 3800 S. Plaza Drive, Santa Ana.

The Pleasant Peasant. 955-2755. 4251 Martingale Way, Newport Beach.

Silver Fox Supper Club. 776-9310. 1168 S. State College Blvd., Anaheim. All major credit cards.

Villa Chianti. 772-7777. The Grand Hotel, #1 Hotel Way, Anaheim. AE, CB, DC, MC, BA.

Villa Fontana. 547-0911. 21 Town & Country, Orange. BA, MC.

DINNER THEATRES/- SUPPER CLUBS

Harlequin, a Dinner Playhouse. 979-7550. 3503 S. Harbor Blvd., Santa Ana. BA, MC.

King Henry VIII Tavern. 527-1510. 823 S. Beach Blvd., Anaheim. BA, AE, CB, DC.

Kono Hawaii. 531-1232. 226 S. Harbor Blvd., Santa Ana. All major credit cards.

Laff Stop Comedy Nightclub. 751-7867. 2122 S.E. Bristol, Newport Beach. AE, CB, DC, MC.

Sebastian's Dinner Playhouse at the Grand. 772-7710. #1 Hotel Way, Anaheim. AE, MC, BA.

Silver Fox Supper Club. 776-9310. 1168 S. State College Blvd., Anaheim. All major credit cards.

ITALIAN

Marri's Pizza. 533-1631. 1194 W. Katella Ave., Anaheim.

Matteo's. 673-8267. 2325 East Coast Highway, Corona del Mar.

Villa Chianti-Grand Hotel. 772-7777. #1 Hotel Way, Anaheim. All major credit cards.

Villa Nova. 642-7880. 3131 West Coast Highway, Newport Beach.

KOSHER STYLE

Lindel's Restaurant-Delicatessen-Bakery. 772-9210. 1783 W. Lincoln Ave., Anaheim. BA, CB, DC, MC.

MEXICAN/SPANISH

Acapulco Mexican Restaurant. 956-7380. 1410 S. Harbor Blvd., Anaheim. BA, AE, MC.

Casa Manana. 635-9320. 1204 S. Harbor Blvd., Anaheim. All major credit cards.

Disneyland Park-Casa de Fritos. 533-4456. 1313 S. Harbor Blvd., Anaheim. BA, MC.

The Red Onion. 634-1888. 1801 E. Katella Ave., Anaheim. BA, MC, AE.

Villa Taxco. 547-9129. 2201 E. 1st St., Santa Ana.

ORIENTAL/POLYNESIAN

Chao's Chinese & American Restaurant. 776-1880. 1560 S. Harbor Blvd., Anaheim. All major credit cards.

Disneyland Park-Tahitian Terrace. 533-4456. 1313 S. Harbor Blvd., Anaheim. BA, MC.

Happy Garden Restaurant. 636-6721. 11761 S. Harbor Blvd., Garden Grove. All major credit cards.

Kono Hawaii. 531-1232. 226 S. Harbor Blvd., Santa Ana. All major credit cards.

Mikayo Restaurant. 541-3303. #33 Town & Country, Orange. AE, BA, MC.

Sampan Restaurant. 533-1071, 533-1261. 420 S. Brookhurst St., Anaheim. AE, BA, CB, DC, MC.

Twin Dragon. 772-4400. 1550 S. Harbor Blvd., Anaheim. All major credit cards.

SEAFOOD

Crown House. 496-5773. 32802 Pacific Coast Highway, Laguna Niguel.

The Cannery Restaurant. 675-5777. 3010 Lafayette Ave., Newport Beach. BA, MC, AE.

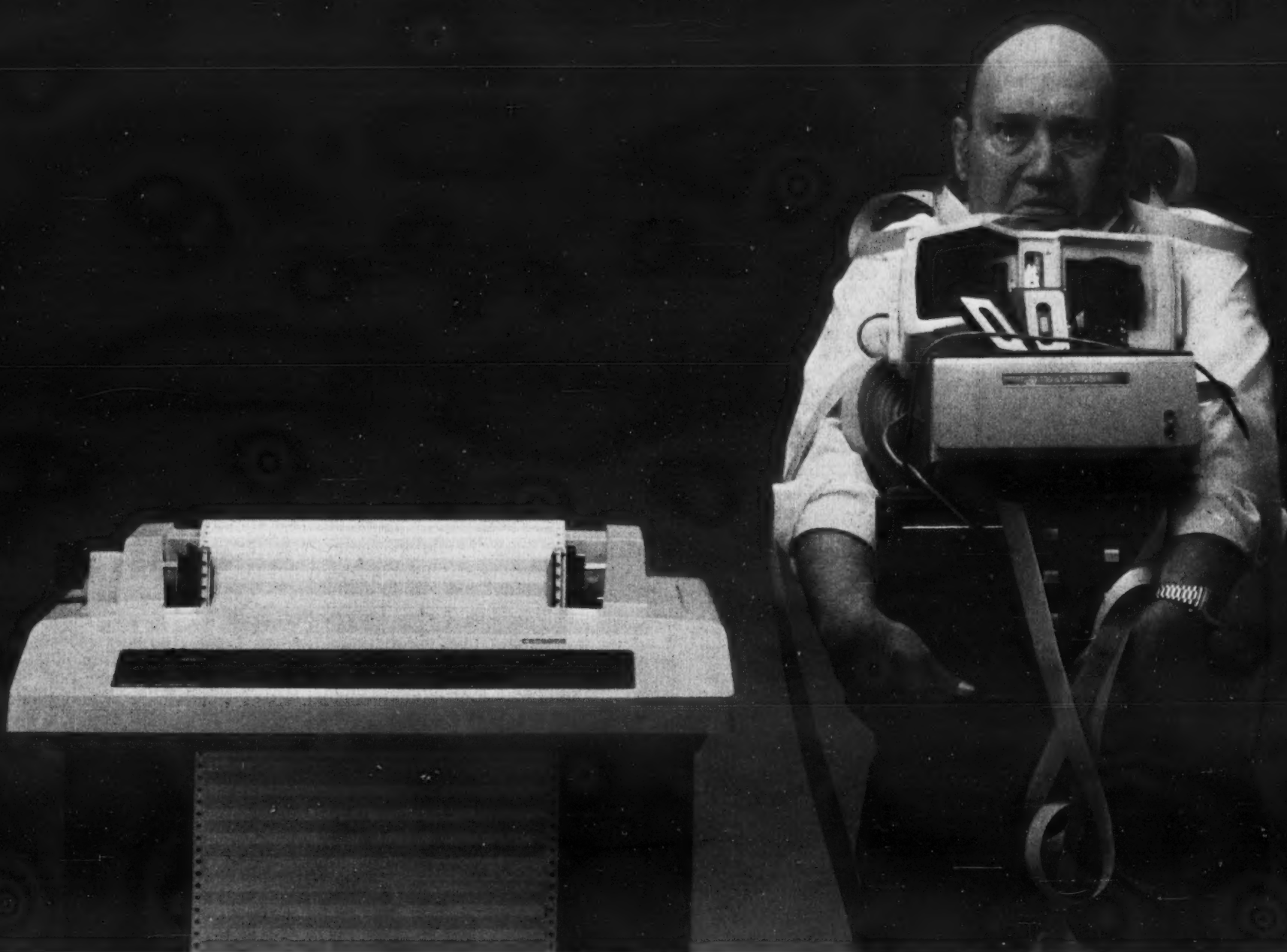
Loose Caboose. 634-9565. 801 E. Katella Ave., Anaheim. BA, MC, DC, CB.

Delaney's. 675-3145. 630 Lido Park Blvd., Newport Beach.

Tale of the Whale. 673-4633. 400 Main St., Balboa. AE, BA, CB, DC, MC.

Villa Fontana. 547-0911. 21 Town & Country, Orange. MC, BA.

(Continued on Page P/8)



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Restaurants

(Continued from Page P/6)

The Warehouse Restaurant. 673-4700. 3450 Via Oporto, Lido Village, Newport Beach. BA, MC, AE, DC.

NIGHT LIFE

Anaheim Depot Restaurant. 991-1970. 1055 W. Ball Road, Anaheim.

The Cannery Restaurant. 675-5777. 3010 Lafayette Ave., Newport Beach.
Cantina Lounge-Disneyland Hotel. 778-6600. 1150 W. Cerritos, Anaheim.

Captain Greenhorn — Quality Inn. 750-3131. 616 Convention Way, Anaheim.

Charley Browns. 634-2211. 1751 S. State College Blvd., Anaheim.
Crescendo. 956-1410. 1721 S. Manchester, Anaheim.

Happy Yeomen-Sheraton Anaheim. 778-1700. 1015 W. Ball Road, Anaheim.

Kono Hawaii. 531-1232. 226 S. Harbor Blvd., Santa Ana.

Laff Stop Comedy Nightclub. 751-7887. 2122 S.E. Bristol, Newport Beach.

Loose Caboose. 634-9565. 801 E. Katella Ave., Anaheim.

Overland Stage and Territorial Saloon. 750-1811. Inn at the Park, 1855 S. Harbor Blvd., Anaheim.

Pirate's Den — Jolly Roger Inn. 772-2722. 620 W. Katella Ave., Anaheim.

Plush Fox Inn Restaurant. 956-3250. 950 Ox Road, Anaheim.

Reflections Lounge — Grand Hotel. 772-7777. #1 Hotel Way, Anaheim.

Sampan Restaurant. 533-1071, 533-

1261. 420 S. Brookhurst, Anaheim.
Showplace Lounge — Anaheim Hyatt. 772-5900. 1700 S. Harbor Blvd., Anaheim.

Ship's Lounge — Anaheim Holiday Inn. 750-2801. 1850 S. Harbor Blvd., Anaheim.

Silver Fox Supper Club. 776-9310. 1168 S. State College Blvd., Anaheim.

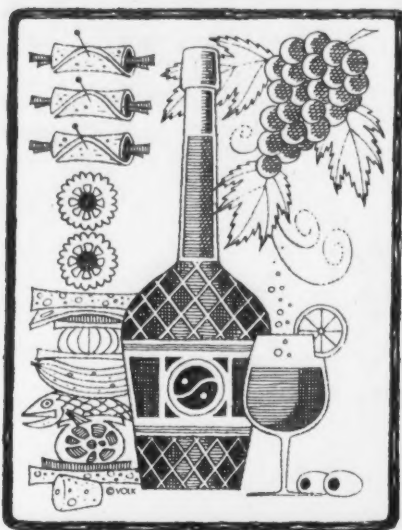
Tom Jones Ltd. 633-3280. 512 E. Katella Ave., Orange.

Top of the Park — Disneyland Hotel. 778-6600. 1150 W. Cerritos, Anaheim.

The Warehouse Restaurant. 673-4700. 3450 Via Oporto, Lido Village, Newport Beach.

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Disneyland: A Fantasy Trip

(Continued from Page P/3)

are voices from the past. The majestic Mark Twain river-boat paddles past plantation docks, the square-masted sailing schooner, "Columbia" unleashes a cannonade at Fort Wilderness, the Mike Fink Keelboats shoot the rapids and swift, guestpowered Davy Crockett canoes navigate the river course.

On Tom Sawyer's Island, there's the mystery of exploring Injun Joe's Cave, the precarious walk across the ever-shifting barrel bridge and the climb to the top of Tom Sawyer's tree house.

In the center of Disneyland is its most famous symbol, Sleeping Beauty Castle, gateway to Fantasyland — the realm of storybook characters brought to life, of villains and vixens who always surrender eventually to heroes and heroines of fiction and legend.

In a nearby diamond mine, the Seven Dwarfs, led by Snow White, whistle while the evil witch brews a potion in her bubbling cauldron. Flying galleons escorted by Peter Pan whisk guests away to Never-Never land, while other adventurers chug down cobblestone streets of Merry Old England reliving Mr. Toad's wild driving escapade.

In Tomorrowland, there's Space Mountain, with its rocket flight through deep space, the silent Disneyland Monorail system and the conventional internal combustion autos speeding on the Autopia freeway. A completely different mode of transportation is presented on the submarine voyage.

And still another form of travel is offered in an "Adventure Thru Inner Space." Here a continuous line of "automobiles" takes guest through a mighty microscope and into the heart of a snowflake.

For a bird's eye view of the park, the skyway buckets trail over the waters of the submarine lagoon, through the caverns of the mighty Matterhorn and high above Fantasyland.

Accentuating the five-acre Tomorrowland are new forms of travel. Passengers on the People Mover experience stepsaving comfort thanks to a constantly rotating turntable platform as they board four-car trains for a view of Tomorrowland and a trip through the Superspeed Tunnel.

Software at NCC

Dataware, Inc.

ANAHEIM, Calif. — Dataware, Inc. will show its software translators and technical personnel will be on hand to discuss the firm's conversion packages in Booth 2749.

The packages to be featured include its RPG/RPG II-to-Cobol DOS or OS Translator, which is used in System/3 consolidation and upgrading; the RPG/RPG-II-to-PL/I DOS or OS package, which offers structured code generation; and the 1400 Autocoder-to-ANS Cobol DOS or OS package, which help the user eliminate emulation cycles, according to the firm.

In addition, the firm will have on display its package that allows Cobol-to-Cobol conversion. Being table-driven, the system can address almost any syntax conversion as predefined in the user's "from/to" table, the firm said. Also on display will be the Easycode/-Easytran-to-ANS Cobol package, which the firm described as an economical answer for transition from Honeywell Information Systems, Inc.

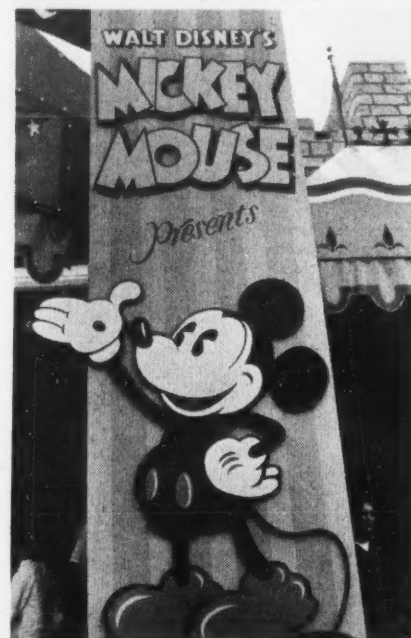
200 series CPUs to "Brand X" computers.

Dataware will also invite attendees to discuss its PL/I-to-ANS Cobol package, which is said to be widely used by those users moving to a single production/standard language-ANS Cobol; its 7070/7074 Autocoder-to-ANS Cobol package, which it calls "the workhorse of second-generation

languages and cycle eater of third-generation computers".

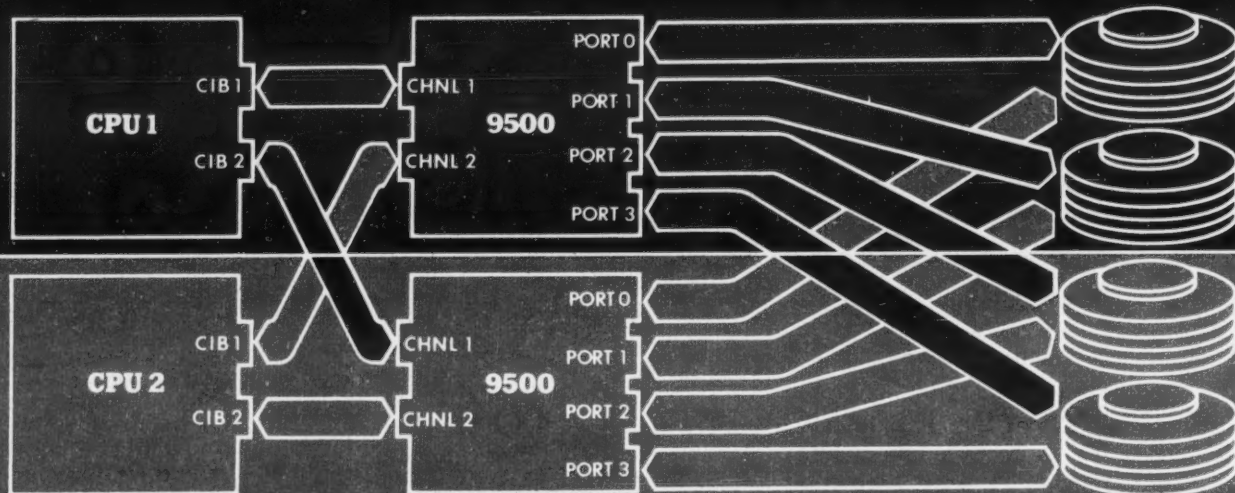
Finally, the firm encourages users to stop by and chat about its BAL/ALC-to-ANS Cobol package, which it described as an answer for the Assembler language maintenance programmer who is always in demand.

Dataware, Inc. is at 495 Delaware St., Tonawanda, N.Y. 14150.



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Cincinnati: (513) 661-9156. Chicago: (312) 392-6126. Houston: (713) 465-2700.
Los Angeles: (714) 754-6555. Sweden, Stockholm: 08/63 62 74. United Kingdom, Woking: (04862) 5077. Germany, Frankfurt: 6102-5464. Sunnyvale HQ: (408) 732-1650.

Cullinane Corp.

ANAHEIM, Calif. — Cullinane Corp. will be showing the Cullinane Data Management System (CDMS) in Booth 1134.

The CDMS is an information facility that, according to the company, addresses the major requirements of any DP organization, including data base management, teleprocessing data dictionary and on-line query.

In the report generation area, The Culprit Output Processor accesses any file type. Included in this family are Culprit/3, a report writer for the IBM System/3, and EEO-Reporter, a federal minority reporting facility that also provides an Affirmative Action plan.

Cullinane is located at Wellesley Office Park, 20 William St., Wellesley, Mass. 02181.

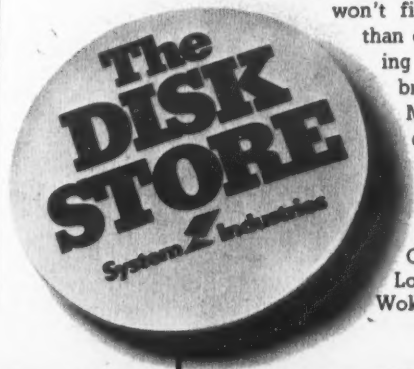
MRI Systems

ANAHEIM, Calif. — NCC attendees will be able to view on-line demonstrations of MRI System Corp.'s System 2000, Control 2000 and TP 2000 at Booth 1404 using a Guinness Book of World Records data base.

The System 2000 is a generalized data base management system and is operational on IBM, Control Data Corp., Univac and Amdahl Corp. equipment. It features self-contained, English-like query/maintenance language; report writer; rollback; host language interfaces for Cobol, Fortran, PL/I and Assembler; multithread; and sequential files.

The Control 2000 is MRI's data dictionary/directory and the TP 2000 is a teleprocessing monitor.

More information can be obtained from P.O. Box 9968, 12675 Research Blvd., Austin, Texas, 78766.



Communications at NCC

Epicom, Inc.

ANAHEIM, Calif. — Epicom, Inc.'s Model 110 communications line monitor will be on display in Booth 2654.

The instrument offers diagnostic capability for IBM's Synchronous Data Link Control (SDLC) and other synchronous bit-oriented communications protocols, the firm said.

The Model 110 has the capability

of viewing and diagnosing synchronous, bit-oriented data. It also allows user selection of up to four character sets compared with the usual two, the firm said. Any three of the four may be multilevel.

First shipments of the unit are expected in July at a single unit price of \$4,500. Epicom is at 592 N. Douglas Avenue, Altamonte Springs, Fla. 32701.

Spectron Corp.

ANAHEIM, Calif. — Three additions to Spectron Corp.'s family of Data-scope data communications test instruments, two accessories and a complete network control center will highlight Booth 1858.

Set to be shown is the D-502B, a test instrument that serves as a data monitor, analyzer and interactive data simulator and tester. The company will also

display the D-301, a diagnostic instrument for data communications problems.

The D-301 features a solid-state memory in place of tape storage and a user-defined data trap for independently stopping the display on selected transmit or receive data. It operates at speeds up to 72 kbit/sec.

The D-201 data printer/monitor serves as a companion unit for Datascopes equipped with the optional



Spectron D-502B

printer output feature. It may also stand alone as an on-line data monitor for asynchronous data at speeds up to 9,600 bit/sec.

Two accessories to enhance the 300/500 series Datascope family will be shown. One is a digital tape unit that may be added to store full-duplex data at speeds up to 9,600 bit/sec. The other is an Ascii/Ebcdic keyboard.

Also featured will be a "typical" network control center featuring Spectron components required to perform monitoring, testing and switching functions.

Spectron Corp. is located at 344 New Albany Road, Moorestown, N.J. 08057.

Timeplex, Inc.

ANAHEIM, Calif. — Timeplex, Inc. will be exhibiting two product series in Booth 4031.

The company will be showing the Dynaplexer Series 1000, a data communications processor which reportedly has the capability of statistical multiplexing, error correction, computer port contention and switching and can handle up to 512 terminals.

Prices start at \$5,975 and range up to \$35,000 with full options and redundancy.

Timeplex will also be exhibiting the Microplexer series models M4 and M8. These units are statistical multiplexers that permit up to eight asynchronous terminals to share a single low- or high-speed telephone line.

They provide error correction on the line and can be used as computer port expanders and terminal cluster concentrators.

The M4 is priced at \$1,750 and the M8 is priced at \$2,750.

Timeplex is located at 100 Commerce Way, Hackensack, N.J. 07601.

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- "Turnkey" network management for the user
- Significant cost advantages

The number of intelligent nodes is only one of the key ways in which TYMNET differs qualitatively from other packet network services. There's also the confidence and security that comes from dealing with a packet network carrier with over five years of intensive operating experience. And the flexibility of a programmable interface to your computer. And coverage to over 130 U. S. cities. And international connections.

TYMNET has been specifically designed to meet the unique operating requirements of geographically dispersed low speed (1200 bps and below) terminals. Typical applications include time sharing, database access, and message switching.

If you're a computer network manager, you owe it to yourself to investigate the many operating and economic advantages of TYMNET, the packet network service acknowledged as number one. For more information on TYMNET and how it can assist with your data communications needs, contact your regional TYMNET office or write or call Tymnet, Inc., 10261 Bubb Road, Cupertino, CA 95014, (408)446-7000.

No. 1 in packet network service for a lot of good reasons

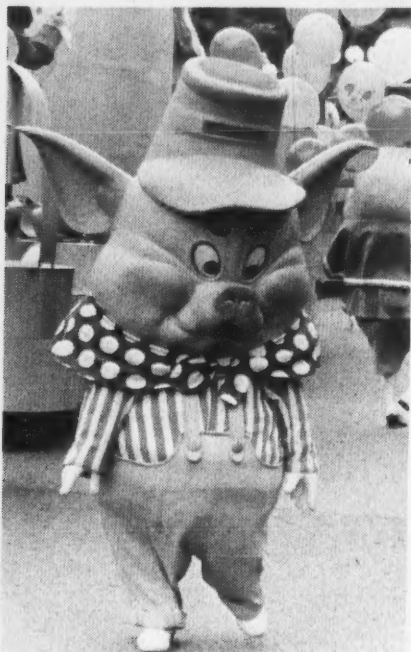
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Western Region (408) 446-7031



Communications at NCC

Tymnet, Inc.

ANAHEIM, Calif. — Tymnet, Inc. will demonstrate both its common carrier data communications network service and its public message switching service in Booth 3314.

Tymnet, the network upon which these services are based, provides terminal access to host CPUs in more than 110 U.S. cities and, through interconnections, to other major world

cities, according to a spokesman for the firm.

Isis Demonstration

Tymnet will demonstrate a network feature called the Internally Switched Interface System (Isis), which can run up to 16 virtual job slots, each of which is a communications interface, the firm said.

Isis can serve as a gateway between Tymnet and a host CPU, a multiport access for a variety of different terminal types or an X.25 or X.72 interface, the firm said.

Also demonstrated will be Ontyme, an advanced store-and-forward message-switching service.

Tymnet is located at 10261 Bubb Road, Cupertino, Calif. 95014.

Atlantic Research

ANAHEIM, Calif. — Atlantic Research Corp. will show the Interview II stand-alone monitor in Booth 1761.

The monitor, recently added to the firm's line of data communications diagnostic test equipment, is said to be an on-line unit that facilitates problem identification in both hardware and software, displaying the data being sent and received over a communications line.

The Interview II is user-oriented, according to a spokesman, who noted it displays data in text, hexadecimal or octal form. Six different languages are standard features.

System errors and malfunctions are identified on a 9-in. 1,024-char. display, the firm said.

The monitor shows two independent pages of 512 char. in full- or half-screen for later comparison. Send and receive data is said to be automatically highlighted for easy identification. Trap and freeze features eliminate the need for bulk storage in most applications.

According to the firm, other key features of Interview II are:

- Direct connection to an RS-232C/V.24 interface.
- Display of full duplex data, with receive data in reverse image for easy identification.
- Display of all data traffic at 62k byte/sec.

The firm is at 5390 Cherokee Ave., Alexandria, Va. 22314.

Vadic Corp.

ANAHEIM, Calif. — Booth 2141 will be dedicated to Vadic Corp.'s 0- to 2,400 bit/sec line of modems including the "50 series," the firm said.

Modems to be shown include the full-duplex, 1,200 bit/sec VA3455 for use on dial-up or two-wire leased lines. Also shown will be the VA1250, a Bell 2025-compatible 1,200 bit/sec modem, which is half-duplex on dial-up lines.

The Bell 103A-compatible VA355 300 bit/sec modem — full-duplex unit on dial-up or two-wire leased lines — will also be at NCC.

Price for the VA3455 is \$825; for the VA1250, \$425; and for the VA355, \$375. Vadic is located at 222 Caspian Drive, Sunnyvale, Calif. 94086.

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In manufacturing, you need to dedicate systems to a range of widely dispersed jobs, and still share the information they generate. On the business side, many departments get more work done more accurately with their own interactive systems. These in turn can be accessible to management as part of an information network.

Hewlett-Packard computers provide both the problem-solving and data-sharing capabilities that can upgrade your entire company's operations — without disrupting your present organization. Our Distributed Systems Network is so flexible it can be tailored to suit the way *you* work.

In the factory...

You can dedicate HP 1000 systems to such tasks as automated testing and final QA, then tie them to another system at production control. Or link systems that handle purchasing and incoming inspection to an HP 1000 used for materials management. Then all these groups of computers can be tied together to give management instant access to relevant data. So you're never caught without enough material to build a product or too much inventory on an item that isn't moving.

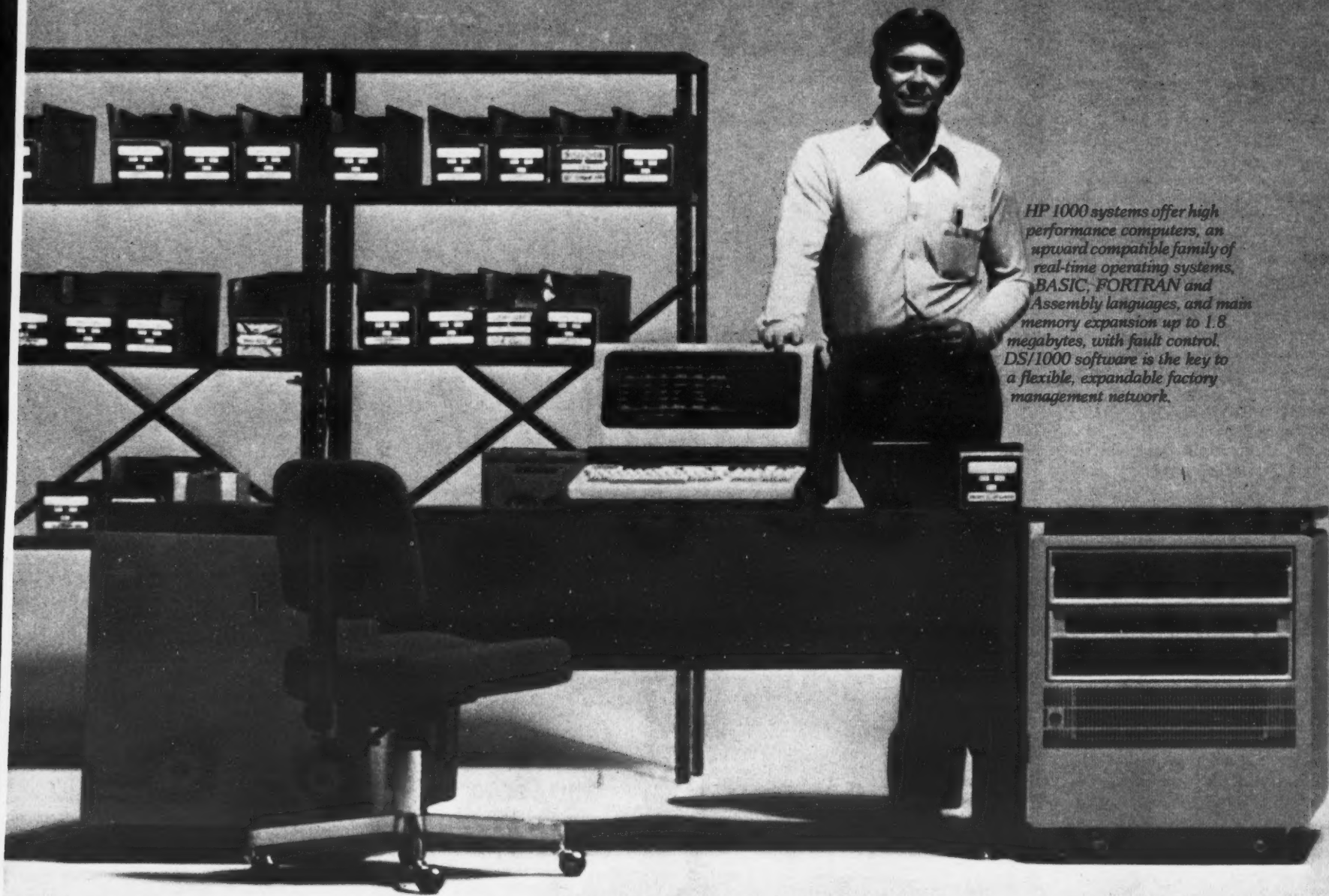
Our DS/1000 software, which took 30 man-years to develop, makes all this possible. It provides an inexpensive link between HP 1000 systems, as well as to our powerful general purpose computer, the HP 3000. You can form a network that fits your company organization precisely. And you don't have to

change your application software when you expand it.

You keep costs down by sharing peripherals. And you can maintain control by developing programs on one HP 1000, then downloading them to the computers doing the work. Most significantly, our "store and forward" feature lets you access data files at remote HP 1000s, moving through intervening nodes in a way that is quite transparent to users.

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On the business side of your company, Hewlett-Packard has a powerful solution to both batch and on-line problems. The HP 3000's layered architecture, IMAGE/3000 Data Base Management and Multiprogramming Executive software allow the computer to



HP 1000 systems offer high performance computers, an upward compatible family of real-time operating systems, BASIC, FORTRAN and Assembly languages, and main memory expansion up to 1.8 megabytes, with fault control. DS/1000 software is the key to a flexible, expandable factory management network.

And, when you're ready,

An interactive information network for your front office.

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A single HP 3000 can support as many as 64 terminals. And it will handle up to six high-level languages—COBOL, RPG, FORTRAN, BASIC, APL and SPL, our streamlined Systems Programming language.

You can give your business side greater control of its management information by tying HP 3000s together with DS/3000 networking software. This lets you use the data and processing power of a remote system as if it were your local computer.

When you're ready, you can forge the final link in a company-wide information system. HP Distributed Systems Network now extends to tying your HP 1000 factory computers into your HP 3000 interactive business systems. (Both sides can hook up to IBM mainframes, too.) In this way, you can call up data about every significant transaction in your company, from the front office to the back door.

Compatibility doesn't end with our computers. We make virtually everything that goes into our systems. In the factory, simple HP data collection terminals can feed the HP 1000 from warehouses, production lines and shipping docks.

And HP-IB interfaces (IEEE-488 standard) make it easy to hook up with instruments for measurement, control and test purposes. A line of printers and CRT terminals (alphanumeric and graphic) and other data entry devices also simplifies tailoring systems to your needs.

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The HP 3000 handles both batch and on-line jobs concurrently thanks to its Multiprogramming Executive and IMAGE/3000 Data Base Management software. It offers six high-level languages, fault-correcting memory and software for a business information network.

CSG803HP43

you can tie it all together!

Communications at NCC

Western Union Information Systems

ANAHEIM, Calif. — Western Union Information Systems will demonstrate a statistical multiplexer at Booth 1310 that monitors the lines connected to it and, as data is offered, multiplexes it in blocks or subframes on a dynamic allocation basis.

The Model 4100/2 accommodates both synchronous and asynchronous terminal equipment, the firm said. Features include error control, network performance statistics and centralized network control.

The system requires no interface modification and can be operated as a single-ended remote statistical multiplexer into a front-end communications processor, a spokesman noted.

The Model 4100/2 terminates synchronous communications lines with speeds up to 9,600 bit/sec and asynchronous lines with speeds up to 4,800 bit/sec, the firm said. The system is controlled by dual monolithic 8-bit microprocessors capable of addressing up to 64K bytes of read-only, programable read-only and random-access

memory with its 16-bit address lines.

Optional features include an auto-speed firmware function to determine line speed for dialed-in terminals, an intelligent time-division multiplexer, an operator panel with keypad, function buttons, display lights and indicators, an echoplex feature for signal verification and a data compression option.

A typical system made up of four synchronous and 16 asynchronous lines, operator panel and display costs about \$10,000 from the firm at 82 McKee Drive, Mahwah, N.J. 07430.

Network Systems Corp.

ANAHEIM, Calif. — Network Systems Corp. will dedicate Booth 4000 to its Hyperchannel, which it said provides "an economical and effective solution to the multicomputer interconnect problem."



Hyperchannel data transfer is at speeds up to 50 million bit/sec, the firm said.

Up to four independent, single coaxial data network trunks allow multiple, simultaneous data paths.

Hyperchannel also offers a multidrop capability (up to 64 Hyperchannel adapters) on a single data trunk, according to the company.

Switch Capability

A switch capability allows any processor to gain access to any other processor or peripheral device on the network, the firm said. In addition, with Hyperchannel all protocol and data movement management is provided, as well as error detection and retransmission logic.

Sharing of resources between facilities that are located up to one mile apart is possible, the firm said, and further if high-quality coaxial cable is utilized.

Network Systems Corp. is located at 6820 Shingle Creek Parkway, Brooklyn Center, Minn. 55430.

Paradyne Corp.

ANAHEIM, Calif. — Paradyne Corp. will be exhibiting its analysis network restoration system, modems and the PIX II virtual data link in Booth 4006.

The PIX II eliminates the teleprocessing software normally required by IBM 360 and 370 and 30 series users building point-to-point communications networks, the firm said.

LCU Included

The PIX-II includes a minicomputer-based Local Control Unit (LCU), which attaches to the byte multiplexer channel of IBM mainframes, and one or more minicomputer-based Remote Control Units (RCU) to which peripherals such as IBM 3270 interactive terminals, tape drives, printers and card

Centigram Corp.

ANAHEIM, Calif. — A microprocessor-based, isolated-word voice recognition system that can "learn" the sounds of up to 16 words will be demonstrated by the Centigram Corp. at Booth 1566.

The system, called Mike, can operate as a remote computer terminal via an RS-232C serial interface or be connected directly to a computer for voice data entry, file inquiry or control applications, Centigram said.

The user selects the words for the particular application in which the system will operate.

A typical vocabulary might consist of the words "left," "right," "start," "stop," "open," "close," "raise," "lower" and "test," for example.

Speech Pattern Recognition

The unit was designed to recognize speech patterns, a spokesman stated. These patterns are generated from the input audio signal and stored in one of 16 locations designated by the user.

Recognition occurs when the pattern to be recognized meets "closeness-of-fit" criteria with one of the patterns previously learned, the spokesman explained.

The system listens continuously and, when a word is recognized, sends out a code as a control signal or as information to be collected for some other purpose. The code can trigger audible feedback for the word recognized so the operator can confirm recognition, the firm said.

Mike can be instructed to reject any incoming signal that does not closely match one of the words in its learned vocabulary or programmed to recognize words that are reasonably close, even at the risk of an occasional error.

The unit's voice recognition electronics are contained on four printed circuit cards and the total weight of the device is approximately seven pounds.

Mike, with voice response, sells for \$5,500; alone, it costs \$3,875. Centigram is located at 1294 Hammerwood Ave., Sunnyvale, Calif. 94086.

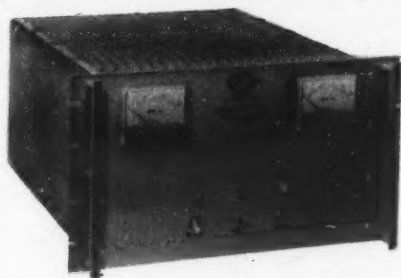
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Communications at NCC

General Datacomm Industries, Inc.

ANAHEIM, Calif. — Data communications products will be the featured attraction in Booth 3015, where General Datacomm Industries, Inc. will be showing off the Netcon-5, a network diagnostic control system providing central site system control and monitoring for remote stations in a multipoint network.

Designed to scan for system faults in a communications network, the Netcon-5 can identify a problem, restore system operation through alternate facilities and, optionally, provide a record of the malfunction, according to the company.

The capacity of the Netcon-5 system is 64 multipoint circuits with up to 32 stations on each multipoint circuit. The system itself is composed of several parts:

- A network diagnostic controller — a microprocessor-based controller to originate and transmit diagnostic commands to the control units associated with each modem.

- A multipoint diagnostic remote unit that enables a remote modem to receive, decode and execute applicable diagnostic commands transmitted by the diagnostic controller. Called the MDR-53, this unit connects to any Bell 201, 202, 208 modem.

- The MDM-52R, a multipoint diagnostic master unit and the coun-

terpoint to the MDR-53 unit for the master modem.

- A MTU-56, a modem transfer unit module used to restore operation by replacing a failed modem with a spare.

- A dial backup unit, the DBU-57, which is used to provide a four-wire, dial backup function. This component can automatically answer two calls to restore station operation in the event

of a primary leased line failure, according to the company.

- A digital bridge, the MAU-1 multiple access unit, which functions as a digital bridge to provide a bridged diagnostic channel to a maximum of four master modems in a network using a time-division multiplexer (TDM).

Among the features of the Netcon-5

are multiple data rates to 9,600 bit/sec, modem transparency to any Bell 201, 202, or 208 modem and automatic testing, which allows central site problem isolation without the use of special test equipment.

Also on display by the company will be its line of modems.

The company is located at One Kennedy Ave., Danbury, Conn. 06810.

Do You Have A Language Barrier?

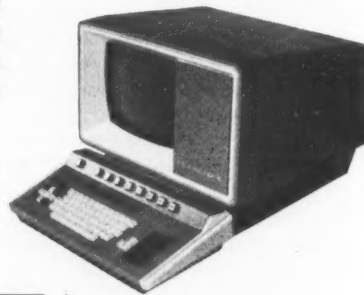
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Western Regional Office: 15910 Ventura Boulevard • Suite 800 • Encino, California 91316 • Tel. 213-990-9777

Sykes Datatronics, Inc.

ANAHEIM, Calif. — Sykes Datatronics, Inc. will show the Comm-Stor II, a communications floppy disk system and latest addition to the company's Comm-Stor line, in Booth 2606.

Comm-Stor II can be used as intelligence for terminals, as well as for time-sharing enhancements, unattended data transfer, remote batch operation, interactive data entry, data logging, distributed processing and Ascii/IBM 3740 conversion, according to the company.

The system uses IBM 3740 compatible diskettes and interfaces with all RS-232 communications devices. Comm-Stor II is microprocessor-based and allows storage and retrieval by file source.

The system features variable-length files, merging files and buffering and individual file protection, according to the firm.

Comm-Stor II also includes a directory listing of file names, local text editing, off-line/on-line operation, up to 9,600 bit/sec operation, data entry, system parameters, more than 240,000 char./disk and IBM 3740 compatibility.

A single-drive system costs about \$3,000 and a dual-drive system about \$4,000, the firm said from 375 Orchard St., Rochester, N.Y. 14606.

Terminals at NCC

Interstate Electronics Corp.

ANAHEIM, Calif. — Booth 1444 will be the place where Interstate Electronics Corp. will display its Intelligent Voice Terminal, a unit that enables operators to input to computers in familiar English language terms via microphones or ordinary telephones.

In cases such as verifying telephone-entered data, the computer "talks" back, repeating the words and figures spoken to it or asking for clarification, the firm said.

The system operates with a single operator station vocabulary of up to 900 words or a 250-word vocabulary for each of four channels or stations plugged into the same processor, permitting source data to be entered in the terminology associated with the operator's task, according to the firm.

The terminal frees the operator's hands and eyes so he can concentrate on primary physical tasks, the firm noted. It has a flexible control program in high-level language that permits the user to write his own applications software without modification to the host computer, the company claimed.

The basic voice terminal includes an

input/operator feedback station, an intelligent controller (user-programmable processor), an asynchronous output or control interface and executive



Intelligent Voice Terminal

software. It can be expanded to handle up to four user input stations simultaneously, provided with a voice synthesizer audio response unit and it accommodates a number of optional features for computer interfacing, input/output peripherals and mass storage, according to the firm.

Single or multiplexed four-channel Ascii interfaces allow interactive operation with most computers or information processing systems, the firm said.

The basic Intelligent Voice Terminal costs \$18,750, including software and documentation.

Interstate Electronics will also demonstrate a plasma display terminal designed for airborne and shipboard applications.

The PD 3000 has a standard alphanumeric and graphics capability as well as inherent panel memory that requires no refresh and a single point write/erase feature, the firm stated. The terminal has standard Ascii keyboard commands for the user, dual RS-232C-compatible interface ports and an optional parallel I/O facility.

The terminal uses a 16-bit parallel microprocessor with a 330 nsec execution time and is able to write a worst case (longest) vector line in 10 msec, the firm claimed.

The basic cost of the PD 3000 is \$12,000. Interstate Electronics is at 707 E. Vermont Ave., P.O. Box 3117, Anaheim, Calif. 92803.

Incoterm Corp.

ANAHEIM, Calif. — Incoterm Corp., now a wholly owned subsidiary of Honeywell Inc., will be demonstrating its Transaction Entry Management System (Items) in Booth 2253.

The system was described as a virtual storage operating system for distributed data processing. The Items software will be operating on the Incoterm SPD-20 Series 40 intelligent terminal system.

Used with the Incoterm terminals, the Items software is said to dramatically reduce the time required to develop and implement distributed applications with extensive local editing, local screen format and data storage, local data entry control, interactive and stand-alone processing options and sign-up procedures.

The firm will also display its SPD 15/25 Series 25 controller.

Incoterm is at 65 Walnut St., Wellesley Hills, Mass. 02181.

Megatek Corp.

ANAHEIM, Calif. — An intelligent refresh vector graphics display system, the Megraphic 7000, will be exhibited in Booth 1715.

The system, manufactured by Megatek Corp., is said to feature 32-bit graphic word length and a 12-bit, 4K by 4K screen resolution, making this model faster than the company's pre-

vious graphics display models.

The refresh memory cards are built into the display case rather than in the host computer.

An interface allows the system to be connected to the Digital Equipment Corp. PDP-11 as well as Data General Corp.'s Nova and Eclipse line; hardware features reportedly allow the ad-

dition of rotation, zoom, scale and clip.

A proprietary 32-bit microprocessor is said to make the system faster than its predecessor.

Megatek will also be exhibiting other hardware and software, including a Fortran graphics software package. The company is located at 1055 Shafter St., San Diego, Calif. 92106.



Ann Arbor Terminals, Inc.

ANAHEIM, Calif. — NCC attendees will be able to see Ann Arbor Terminals, Inc.'s line of CRT terminals and display electronics in Booth 4007.

The firm will be featuring its Model 800, with memory size of 60 lines by 80 char., display size of at least 40 lines by 80 char. and block transmission ability, the firm said.

The \$2,000 terminal's edit capabilities include the ability to insert or delete a character or line and erase to the end of a line or page. It also features character accent with blink, dim and reverse-video capabilities and includes upper/lower case display.

Ann Arbor Terminals is at 6017 Jackson Road, Ann Arbor, Mich. 48103.

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Terminals at NCC

Intelligent Systems Corp.

ANAHEIM, Calif. — Intelligent Systems Corp. will be demonstrating a number of its color CRTs, graphics terminals and desktop computers in Booth 4407.

The 8070 and 8071, which make up the recently announced Intecolor Series I, feature a 19-in. CRT, background color, insert/delete for characters or lines and a 48-line format.

Additional features include a keyboard with cursor, numeric and color pads, dual 8-in. floppy disk drive, matrix printer and a 24K bytes of read-only and programmable read-only memory (ROM/Prom), with an additional 8K bytes of random-access memory available.

The 8070 costs \$7,000 in quantities of up to 24 and \$6,300 in quantities of 25 to 49. The 8071 is priced at \$7,500 in quantities up to 24, and \$6,750 in quantities of 25 to 49.

Also on display will be the 8001G color graphics CRT, which the company said will be particularly attractive to the process control industry.

The system, which comes with a 48-line by 80 char./line display, features a 19-in. screen with eight colors, a complete graphics package (160 by 192 points in the grid area) and selectable data rates up 9,600 bit/sec.

Prices for the 8001G start at \$2,750 for quantities to 24 or \$1,925 on a cash-with-order basis or for 100-unit quantities.

The Intecolor 8031, a desktop computer, will also be on exhibit. The 8031 is a stand-alone color microcomputer system, according to the company, and is based on the 8080A MPU.

Ontel Corp.

ANAHEIM, Calif. — Ontel Corp. will use Booth 1255 to present its OP-1/R user-programmable intelligent terminal system.

The OP-1/R is "downward-compatible" in that it will run standard OP-1 programs, including those written in Ontel's high-level languages, utilities and communications packages, according to the firm. It is configured to be used in clustered or on-line systems.

Features include multiple microprocessors sharing memory, which may be 4K, 8K, 16K or 32K bytes of random-access memory, plus up to 8K of read-only memory or programmable read-only memory, the firm said.

The Op-1/R CRT features upper and lower case, a set of 128 displayable characters and a 7 by 9 dot matrix.

Communications capabilities are asynchronous from 110 bit/sec to 19.2k bit/sec. A parallel Centronics Data Computer Corp. interface is available.

Price of the system in OEM quantities starts at under \$1,500. Ontel is located at 250 Crossways Park Drive, Woodbury, N.Y. 11797.

Language for the system is Disk Basic 8001. A complete graphics package with graphics plot hardware, expanded graphics software with eight-color background and foreground, a 160 by 192 grid area and a 48-line by 80-char. format are also part of the system.

Prices for the 8031 are \$4,495 in the one to 24 range and \$3,995 for cash-

with-order.

An additional desktop computer which will be demonstrated is the 8051, which also is based on an 8080A microprocessor. The 8051 is similar to the 8031, but comes with 21K bytes of Eprom/ROM and 16K RAM.

Half of the RAM is used for user workspace and half for refresh.

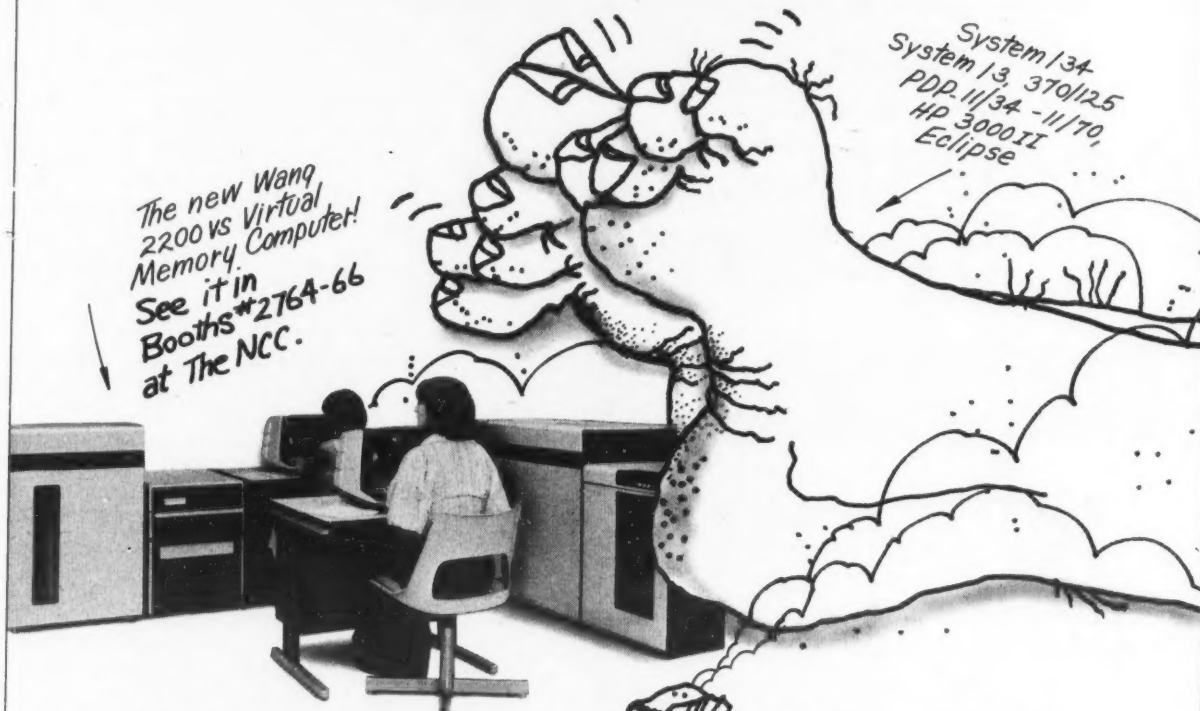
Prices are \$4,495 in one to 24 lots and

\$3,995 for cash-with-order units.

The company will also be demonstrating Arabic and Farsi color graphics microcomputer systems, designated the A8051 and the F8051, respectively, which process all I/O in Arabic.

Intelligent Systems Corp. is located at 5965 Peachtree Corners East, Norcross, Ga. 30071.

Wang's VS computer. The bigger giant killer.



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Terminals at NCC

Magnavox Display Systems

ANAHEIM, Calif. — Magnavox Display Systems will show the latest addition to its Orion-60 series of plasma display-based graphics terminals in Booth 3410.

The unit is a desktop, stand-alone graphics terminal incorporating a disk operating system with full-size floppy disk drives.

The system includes an editor, 8080 assembler, dynamic debugger and a file handler. The disk operating system will support both a Fortran IV compiler and a Basic interpreter containing graphics subroutines and extensions as well as other high-level languages, the vendor said.

Earlier versions of the terminal include the Orion-60/S1 which provides extended user random-access memory that can be programmed in Assembler language, the company claimed.

The Orion-60/S2 and S3 offer resident Basic with graphics extensions and minifloppy disk drives.

Magnavox will also demonstrate an optional random-access 35mm rear projection unit contained within the

Orion-60 enclosure.

Additional information is available from Magnavox Display Systems, 2131 S. Coliseum Blvd., Fort Wayne, Ind. 46803.



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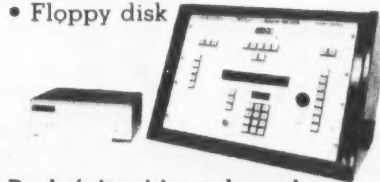
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|--|--|

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Dealer's inquiries welcomed

Evans & Sutherland

ANAHEIM, Calif. — A computer graphics system capable of three-dimensional displays, clipping and viewport mapping will be displayed by Evans & Sutherland Computer Corp. at Booth 1241.

Based on a Digital Equipment Corp. PDP-11, the system is available with several options. These include an 11- by 11-in. data tablet, alphanumeric keyboard, light pen, joystick unit, and a hard-copy unit, the firm noted.

Called the Picture System 2, the system is available with a compre-

hensive graphics software package that can be accessed from either Fortran or Assembly language programs, according to the company.

Other features of the system include a picture memory, which is a random-access storage space available to the programmer for storing processed or unprocessed data during the display cycle, a picture generator, a picture display and interactive switches.

Evans & Sutherland is located at 580 Arapen Drive, Salt Lake City, Utah 84108.

Delta Data Systems Corp.

ANAHEIM, Calif. — Three programmable multifunctional CRT terminals will be introduced in Booth 2549 by Delta Data Systems Corp.

The Delta 7000 series CRT terminals incorporate 16-bit microcomputers, 14-in. diagonal screens, a 128-character set expandable to 912 characters and a split-screen option that allows division of the screen into eight independent display areas.

Also available is an option for the simultaneous display of different character fonts, according to the firm.

The Delta 7000 has a basic editing program in read-only memory (ROM) and includes a programmable read-only memory (Prom) boot loader program that allows the user to load specific applications programs from a

floppy disk system or from the CPU.

The basic editing package includes alphanumeric data entry, insert/delete capabilities, format mode, tabbing, cursor controls and an electrically alterable ROM.

System Possibilities

The Delta 7000 has up to 28K bytes of ROM or random-access memory (RAM). It can operate as a text-processing terminal, a high-speed communications terminal or a small processing computer, the firm said.

The Delta 7500 is a RAM-loadable version of the Delta 7000. It is stan-

Hitachi America

ANAHEIM, Calif. — Hitachi America Ltd., occupying Booth 4253 will demonstrate a microprocessor-controlled, seven-color graphics display terminal that incorporates up to 64K bytes of memory.

The H-7000 uses the firm's M-6800 8-bit microprocessor and provides more than 50 command possibilities, the firm noted. The display can be used for process flow control diagrams, tables of process information, trend records, bar charts, limit alarms and changes, as well as common alphanumeric.

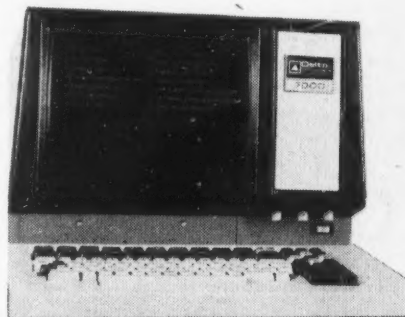
Dual Memory Function

The unit has a dual memory function that permits the superimposing of two pictures, a spokesman stated.

Display-generating software, provided with the unit, permits any host computer using Ansi Fortran to input to the terminal, the spokesman said. An operator can generate or modify a display picture using English language instructions through the CRT terminal.

Options include a hard-copy printer, floppy disk drive, slave monitors and keyboards, lightpen and joystick, the firm said.

Hitachi America, Ltd. is at 100 California St., San Francisco, Calif. 94111.



Delta 7000

dard with 8K bytes of RAM, expandable in 4K-byte increments up to 32K bytes.

The Delta 7300 contains a resident editing and text processing program that supports up to 3K bytes of expanded refresh memory, the firm said. It is standard with 20K bytes of RAM, expandable in 4K-byte increments to 32K bytes.

In addition to the editing capabilities of the 7000, the Delta 7300 offers the following: Define Word; Sentence; Paragraph and Block; and Move, Copy or Delete Text.

Other features of the 7300 include the ability to capitalize and decapitalize strings of data, search, search and replace, search and delete, make temporary hyphenations and count lines and words.

Delta Data Systems Corp. is located at Woodhaven Industrial Park, Cornwells Heights, Pa. 19020.

Terminals at NCC

Univac

ANAHEIM, Calif. — Univac will show a wide range of products at Booth 4223.

Included in its demonstration will be the Universal Terminal System 400 (UTS 400) acting in a stand-alone capacity as intelligent terminals, as well as on-line to Univac 1100 series computers at the company's facilities in Roseville, Minn.

Uniscopes 200 CRT terminals will be connected on-line to the firm's Series 90 computers at its headquarters in Blue Bell, Pa., and at facilities in the Los Angeles area.

The Uniscopes 200 terminals will be used to demonstrate the Information Management System 90 (IMS 90), the Data Management System 90 (DMS 90), the VS/9 operating system and the Unis 90 software program for manufacturing control, the firm said.

The recently announced Universal Distributed System 2000 (UDS 2000), a free-standing, user-programmable, key-to-diskette data entry system, will be shown in operation with four workstations, a spokesman said.

In addition, the firm said, a BC/7 small business computer system will be demonstrated

running the basic applications typical to small business concerns.

Univac Minicomputer Oper-

ations will show a V77-600 minicomputer together with the Pronto distributed transaction software package.

Disk drives produced for the OEM market by Univac in Cupertino, Calif., will also be on display, the spokesman

said.

Univac's headquarters address is P.O. Box 500, Blue Bell, Pa. 19422.

With SYSTEM 2000[®], you get more than just a DBMS.

You also get

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- Greater productivity in applications development
- Lower software maintenance costs
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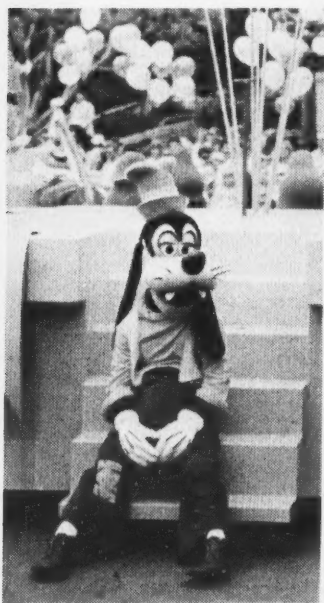
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Analysis (SIA) • Systems Dimensions, Ltd. (SDL) • Telesystems (Paris Telephone) •
Tymshare • United Computing Systems, Inc. (UCS)

Terminals at NCC

Digi-Log Systems, Inc.

ANAHEIM, Calif. — Digi-Log Systems, Inc. will exhibit three products in Booth 1465: a desktop workstation, a data communications line monitor and a portable CRT terminal.

Microterm II, the firm's desktop workstation, features a dual-microprocessor direct memory access architecture and a multitasking operating system.

Microterm's software facility includes Isam file controls,

data base control, an English command language, sort capabilities, utilities, IBM 2780 remote job entry emulation, teletypewriter emulation and an interactive software development system.

All user applications can be programmed and debugged in either Extended Business Basic or Assembly language from the Microterm II keyboard, a spokesman for the firm noted. The DLM II/Taptrap data

line monitor system was designed to isolate errors in data communications networks, the firm said. DLM II features large screen display, portability and the ability to trap and store up to one million data characters, according to Digi-Log.

Trap Sequence

A trap sequence of up to 16 characters can be user-programmed from the Tape-trap keypad to start or stop recording on detection. The recorded data can then be searched with the same or different trap sequence or displayed at any rate convenient to the operator.

Telecomputer II is a CRT monitor with keyboard, acoustic coupler and control unit mounted into a briefcase.



Digi-Log Microterm II

Datamedia Corp.

ANAHEIM, Calif. — The first two members of the Elite 3000 family of microprocessor-based CRT terminals from Datamedia Corp. will be the focus of Booth 1400.

The first, the Elite 3025A, is a communications-oriented unit for transaction processing and inquiry response applications.

The second, the Elite 3052A, is a Digital Equipment Corp. VT-52-compatible alphanumeric CRT.

The 3025A is a buffered Teletype-compatible CRT terminal with a single-page video memory that displays 1,920 alphanumeric characters in a 24-line, 80-character format, the firm noted.

The 3052A offers formatting capability, eight levels of screen enhancements and a detached keyboard.

Datamedia also plans to show the Elite 1521A, an unbuffered Teletype-compatible CRT displaying 1,920 alphanumeric characters in a 24-line by 8-char. format. This unit is available with either the full 128-char. Ascii set or the 64-char. upper case subset with dual intensity display.

System Features

The stand-alone 1521A contains an alphanumeric display, keyboard, storage, control logic and asynchronous communications interface, the firm added.

The 1521A was designed for interactive applications, data entry information retrieval and any related data communications requirement. It accommodates a standard RS-232C or optional 20mA current-loop interface, Datamedia said.

The base unit price for the

Elite 1521A is \$1,200.

Datamedia is located at 7300 N. Crescent Blvd., Pennsauken, N.J. 08110.

Chromatics, Inc.

ANAHEIM, Calif. — Booth 1726 will be the scene of the introduction of Chromatics, Inc.'s line of color graphics terminals. Each model in the Chromatics eight-color graphics line employs a Z80 microprocessor unit with full memory and I/O structure,

according to the firm.

Standard interfaces include 128-key keyboard, variable synchronous and asynchronous transmission rate and serial I/O with TTL and RS-232C compatibility. Optional interfaces include RS-422, IEEE-488 and 20mA current-

loop.

An additional serial port and a parallel 8-bit or 16-bit port with a direct memory access controller allowing transfer rates to 416,000 byte/sec are also optional, the firm said.

According to Chromatics, alphanumeric may be placed at

any point on the screen and multiplied to any integer size in both height and width. A standard Ascii set is provided along with 96 user-definable graphics symbols.

Chromatics is at 3923 Oakcliff Industrial Court, Atlanta, Ga. 30340.

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Terminals at NCC

Data 100 Corp.

ANAHEIM, Calif. — Data 100 Corp. will exhibit in Booth 2337 "a full range" of multifunction DP systems including the first public viewing of its recently announced Model 85-based series of Remote Information Systems (RIS), as well as remote communications printers and disk and printer subsystems.

The RIS series is based on the Model 85 Attached Applications Processor (AAP), which performs high-level language processing using RPG-II and Cobol, in conjunction with the firm's models 76, 78, 82 or Keybatch terminal systems.

The Model 85 AAP consists of a control unit with 96K to 128K of main memory, 10M to 100M characters of fixed and/or removable cartridge disk storage and up to 15 CRT stations (located up to 2,000 feet from the processor) with 1,920-char. screens and typewriter or keypunch-like keyboards.

Peripheral equipment can include up to five printers with speeds from 62- to 1,250 line/min and 9-track, 800- and 1,600 bit/in. magnetic tape drives. Selected peripheral devices such as printers, magnetic tapes and operator display stations may be switched between the AAP and its associated processor, the firm said.

processor, the firm said.

The RIS communicates in synchronous protocols using point-to-point or multipoint techniques and in Synchronous Data Link Control (SDLC) protocol.

Software includes interactive Ansi 1974 Level 2 Cobol and RPG-II compilers to assist customers in developing fill-in-the-blanks data entry and remote file management capabilities, according to the firm. A multitasking operating system allows up to eight independent tasks to be performed concurrently.

The Model 85 AAP will be shown in

conjunction with the Model 78 remote processing system, which also operates under the company's Keybatch software. The Model 78 uses RPG-II for local data manipulation and generation of management reports.

Also displayed will be the Model 82 remote display system with IBM 3270-compatible on-line inquiry capabilities. When combined with the models 78 or 74 Keybatch systems, it provides multifunction features including shared displays, full backup capabilities, concurrent data entry and remote batch functions, the firm said.

The company's OEM Sales Division will show its series of remote communications printers which receive and print data transmitted via industry-standard communications protocols.

Data 100 Corp. is located at 6110 Blue Circle Drive, Minneapolis, Minn. 55435.

Inforex, Inc.

ANAHEIM, Calif. — Four major product families will be demonstrated at Booth 1121 by Inforex, Inc. They include the System 7000, a series of distributed processing systems; the System 5000 file management systems; the System 1330, which combines data entry with remote job entry (RJE) ca-

pabilities; and the System 3300 key-to-disk data entry systems.

The System 7000 is a microcomputer-based family of stand-alone and clustered terminal systems, according to Inforex, and supports two different kinds of multitasking capabilities. The first allows access to the same data

base by more than one terminal; the second permits several different kinds of tasks to occur concurrently such as data entry, local processing and report generation.

Prices for a minimum configuration, stand-alone System 7000, which includes a processor and keyboard/CRT station, dual diskette drive and binary synchronous communications interface, start at \$14,350, or \$320/mo on a 42-mo contract.

The System 5000 is also mini-computer-based, and is oriented to multiterminal filing and file updating using two-letter commands to update, retrieve, display or print any record within a specific file, Inforex said.

A typical configuration of the system with one control unit, four terminals, a 30 char./sec printer and a 25M-byte disk drive sells for approximately \$104,000 or leases for \$2,000/mo on a 42-mo contract.

The other two products to be demonstrated, the System 3300 and the System 1330, are used in data entry and editing. The System 1330 combines data entry and validation capabilities with RJE features, such as storage of message formats and transmission parameters, according to the company.

A typical 1330 configuration, with control unit, four keystations, 10M bytes of disk storage, tape drive and a 600 line/min printer, leases for approximately \$1,950/mo on a 36-mo contract).

The System 3300, a step up from the 1330, features validation and insertion of data through index sequential tables and can respond to inquiries of tables up to 2M characters in less than 1 sec, a spokesman claimed.

A basic System 3300 with control unit, 10 operator stations, 10M-byte disk drive and tape drive leases for \$2,020/mo on a 60-mo lease.

The week of NCC coincides with the 10th anniversary of Inforex, according to the company, and that event will be celebrated with special demonstrations and activities at the Inforex booth. The firm is at 21 North Ave., Burlington, Mass. 01803.

Tektronix

ANAHEIM, Calif. — Tektronix, Inc. will feature several of its CRT terminals in Booth 2309.

The terminals can be used in management information systems, inventory control, purchasing, salary administration, forecasting, mapping, modeling and design applications, according to the company.

Tektronix will feature its 4020 series of CRTs, 4014-1 CRT with Option 40



Tektronix 4025

programmable keyboard capability, 4010 CRT terminal, 4006-1 terminal, 4051 graphics system, 4907 file manager, 4081 interactive graphics terminal, 4662 interactive digital plotter and 4631 hard-copy unit.

Also displayed will be the 4025/24, a unit for the alphanumeric user who wants to use graphics, according to the company. The 4025 is a raster scan terminal that can copy up to 53 lines of alphanumerics and graphics with a Tektronix hard-copy unit.

The Option 40 programmable keyboard capability, when used with the 4014-1 or 4015-1, distributes the graphics workload by allowing the user to save the material locally for display.

Tektronix, Inc.'s Marketing Communications Department can be reached at Mail Station 60-631, Beaverton, Ore. 97077.

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Our Model 85 remote information system introduces the functions of remote file management and high level language processing at your remote sites efficiently and economically.

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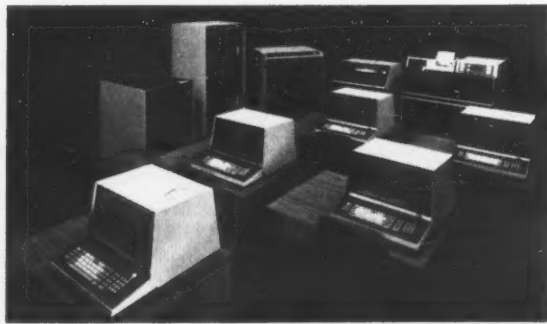
The Model 85 gives your network the best of both worlds. The degree of central site control you need *and* remote processing capabilities to reduce communications costs and mainframe processing time.

And the Model 85 can communicate with our other proven Data 100 multifunction data processing products.

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Peripherals at NCC

Centronics Data Computer Corp.

ANAHEIM, Calif. — Centronics Data Computer Corp. will demonstrate several serial dot matrix printers, a series of line printers and two versions of its 150 line/min micro printer at Booth 1447.

The Series 700 includes the models 700, 701, 702, 703, 779, 780, 781 and 761 dot matrix printers, a spokesman said. Each unit in the line utilizes three to four modules that control each step in the printing process.

The print module uses either a synchronous motor band drive or a stepping motor drive, depending on the printer model. The module can be configured to produce 5 by 7, 7 by 7, 9 by 7 and 9 by 9 dot matrix patterns, the

firm stated. Six line/in. vertical spacing is standard on all 700 members and paper movement is up to 15 in./sec (Model 703).

A keyboard module used with the Model 761 contains 61 sculptured keys arranged in standard typewriter fashion. Optionally, a 10-key numeric pad is offered for high-numeric use environments.

Four different paper handling modules — a pinch roll, tractor feed, pin feed platen and front feed — are available that can accommodate paper widths from 9.8 in. to 11.7 in., depending on the printer model, the spokesman continued.

Finally, printer control is maintained

by an electronics module that contains an input power transformer, DC power supply and logic card.

Printers in the 6000 series, which include the 6075, 6150, 6300 and the 6600, operate at 75- to 600 line/min. The units, also microprocessor-controlled, have a 64-char. set, can accommodate one- to six-part forms, paper widths of from 4 in. to 19 in. and use cassette-encased ribbons, the firm said. A paper restack tray, out-of-paper sensor and parallel interface are also included as standard equipment.

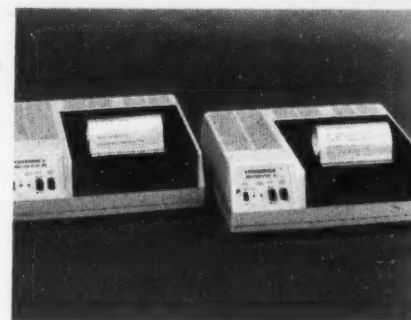
The models 306TP and 306SC printers, also on display, are serial dot matrix printers that can print alphanumeric characters, symbols and contiguous horizontal/vertical bars.

The 306SC can print lines of characters from the standard .1 in. high to newspaper front-page banner headline size on an 8-in. line, the firm pointed out. The unit has the capacity to store 320-char. for segmented, geometric or bar code printing and up to 128 standard char.

Applications for both units include material handling and warehouse systems as well as shelf tag label printing in supermarkets, the spokesman said.

Centronic's Microprinter models PI and SI are RS-232 bus-compatible and

operate at speeds up to 150 line/min, the firm noted. The units feature 96 char. (upper and lower case), underlining functions, an audio alarm and ei-



Centronics Microprinters

ther a 7-bit serial interface with parity selection or a parallel interface with transistor-transistor logic compatible I/O signals.

The printers use a conductive aluminized coated paper, vaporized by a low voltage discharge from the print head, the firm stated.

The Microprinter is priced at \$695 and the 306TP and 306SC cost \$2,280 and \$3,950, respectively, in end-user prices.

Centronics is located in Hudson, N.H. 03051.



Summagraphics

ANAHEIM, Calif. — The Summagraphics Corp. will show a digitizer called the Bit Pad in Booth 1760.

Bit Pad is a high-performance digitizer designed for small system users that permits entry of positional information, according to the vendor.

The Bit Pad is designed for collection of X and Y values and is claimed to be interfaceable to any microcomputer currently on the market. The firm said Bit Pad can be used in applications involving medical treatment, opinion sampling, design, games, research, computer animation and other areas.

Bit Pad costs \$555, Summagraphics Corp. said from 35 Brentwood Ave., Fairfield, Conn. 06430.

Clary Corp.

ANAHEIM, Calif. — Clary Corp.'s Precise Instruments Division will be showing printers ranging from strip devices to serial entry decimal printers to line printers in Booth 4009.

The Model 2000, Model 4000 and Model 7000 line printers will be featured.

The 70-pound Model 2000 uses a hypocycloidal printing mechanism to provide reliability and incorporates a ruggedized design, the firm said. The 4000 uses Model 2000 design and printing mechanisms, but is recommended for commercial applications, and the 10 line/sec Model 7000, also designed for commercial applications, offers a maximum of 20 data columns and weighs 32 pounds.

The Model LP 321 digital printer prints up to 21 columns on pressure-sensitive paper at rates of up to 63 char./sec.

Expandable to 21 columns, it allows 16 character positions per column and prints at a rate of three line/sec.

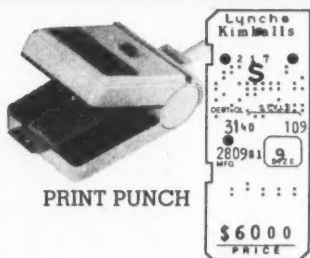
To round out the display, two strip printers will be shown.

The Model SP20 commercial strip printer is aimed at military applications and weighs 8 lb. It prints 200 word/min and requires little maintenance, according to the firm. The Model AN 16, weighing only 4 lb., produces an alphanumeric strip using the simplest method of data reproduction — impacting pressure-sensitive paper between a hammer and a character wheel "on the fly."

It prints 25 char./sec.

Clary is at 320 W. Clary Ave., San Gabriel, Calif. 91776.

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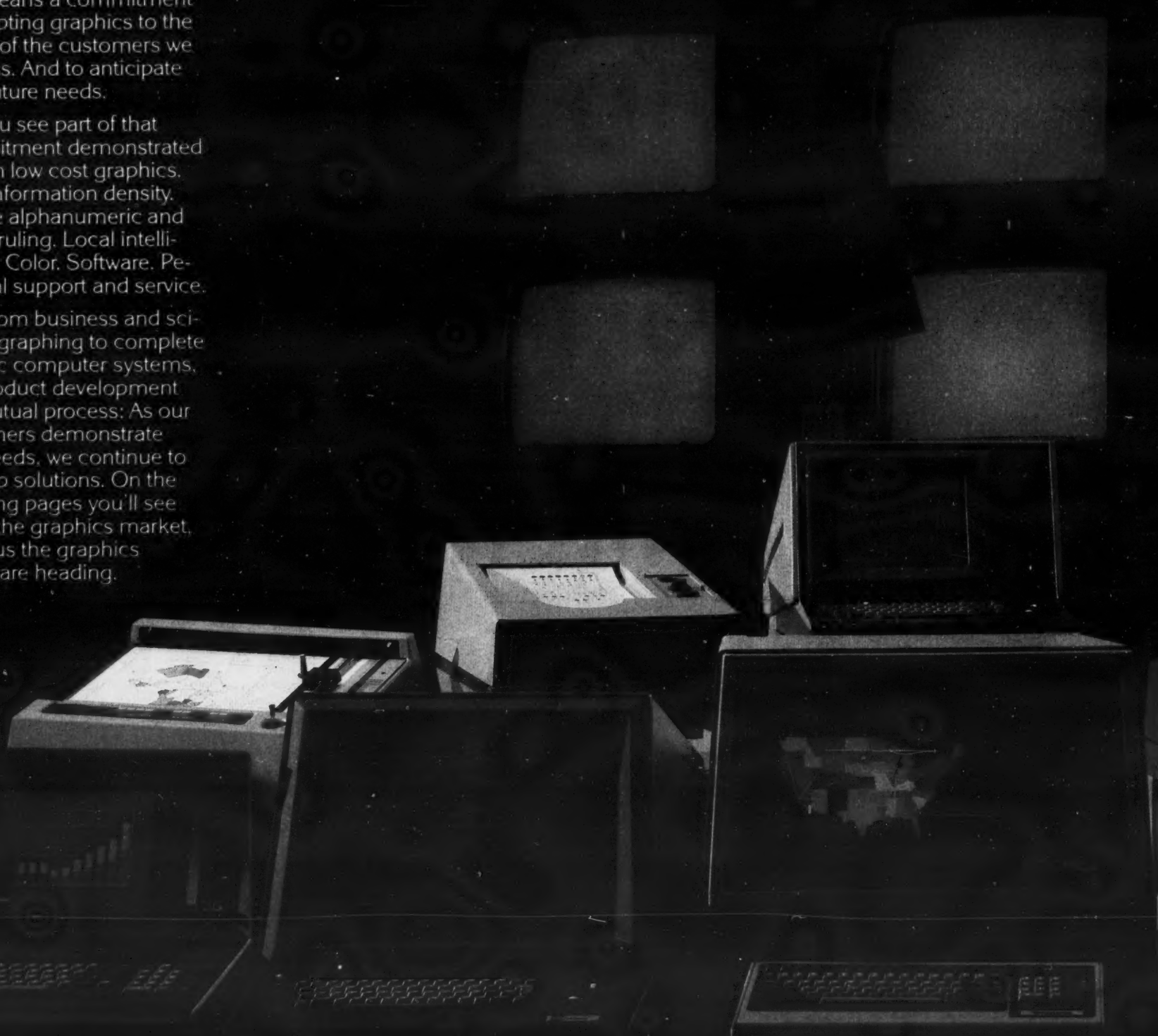
The Inside Story

"Service to the markets, more than any single innovation, has maintained our graphics leadership."

At Tektronix, we're famous for quality assurance. And we're also famous for value assurance: that means a commitment to adapting graphics to the needs of the customers we address. And to anticipate their future needs.

You see part of that commitment demonstrated here. In low cost graphics. High information density. Simple alphanumeric and forms ruling. Local intelligence. Color. Software. Peripheral support and service.

From business and scientific graphing to complete graphic computer systems, our product development is a mutual process: As our customers demonstrate new needs, we continue to develop solutions. On the following pages you'll see where the graphics market, and thus the graphics leader, are heading.





Storage

ACTUAL
SIZE



"We found customers asking for even more information capacity. Now we're offering them 25-inch graphics."

Ten years ago Tektronix storage tube (DVST) technology plummeted the price of graphics to a fraction of its former cost.

Today, about four out of five CRT graphics terminals are of Tektronix origin. Most are from our high-resolution DVST family. Our customer base is as broad as business and industry, government and education.

We're sensitive both to the graphics needs of new customers, and to the need of experienced graphics users to expand capabilities at minimal cost.

Our 19-inch, high resolution display, introduced in 1974, was a response to the requests of sophisticated computer users for a bigger and more detailed graphics workspace. About the same time we satisfied the requests of newcomers—in education and business environments, for example—for basic graphics capabilities priced under \$3000.

Other DVST terminals are also offering enhanced capabilities—from plug-in intelligence to combined refresh and storage.

The state-of-the-art is based on stated needs.

Now we are introducing our 25-inch 4016-1 terminal. Several years in development, it has been built with specific markets in mind: Customers from network modeling, mapping, and IC design and layout let us

know the value of increased graphics capacity. Plus 86 lines of 179 alphanumeric characters per line.

Size alone called for breaking through several technological barriers. At the same time, the design team integrated various features and options based on direct customer input: like detachable keyboard. Larger display copy. Local digitizing.

Final criteria was based on conformity with existing customer systems.

Users of our smaller screens will be able to expand their capabilities, as necessary, to 25-inch graphics with little or no modification to existing applications software and communications support.

At Tektronix, innovation is a partner with practical application. That means knowing the market—existing customers and new—and knowing how to provide for their individual needs.



The advantages of greater information capacity on the Tektronix storage tube are especially clear in environments like cartography, urban planning, and network modeling.

"Many of our customers are ready for color. Now for the first time, color is ready for them."

Tektronix has long been a leader in refresh capability. Our first, highly-rated alphanumeric terminal was a pioneer in forms-ruling.

Now we have increased this capability to meet new needs. Our recent additions have brought new levels of both graphics simplicity and sophistication into the marketplace.

The 4020 Series offers general business environments an easy evolution to graphics.

Expandable from simple alphanumerics to graphics, this new series makes graphing capability as easy as alphanumeric output has been for years. Yet it's versatile. Rather than fix a few graphing formats in firmware, we designed a complementary English-language, PLOT 10 Easy Graphing software package. Now many non-graphic information systems can easily add graphics capability.

Even more significant may be the introduction of our new color terminal, the 4027.

It literally sets the standard for color graphics — from the one company with the expertise, the service and reputation to give real value to color capability.

This represents the first effort to bring universal order to color graphics.

When we brought out our first storage tube terminal and supporting software years ago, we developed standards and coding systems that are still in use today. The same will be true for color.

We've also made sure that our current customers can make an easy transition from present graphics to color: with compatible software. Multi-color plotter support. Gray-scale hard copy . . . and continued innovation as our customers' color requirements advance.

Tektronix color is designed to facilitate graphical interpretation of statistics in business graphing, and to answer the needs of computer-assisted instruction, laboratory analysis, mapping and network modeling.

Until now, these applications could only imagine the possibility of color graphics. We're making it practical.



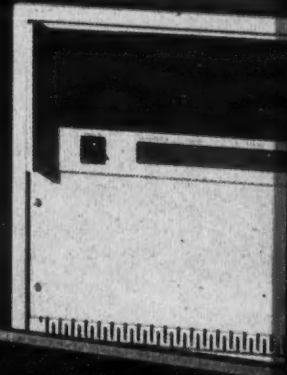
Tektronix color will add a new dimension, clarity and convenience to many applications. Sometimes a simple change of color can communicate even more quickly than a graph.



Refresh



Intelligence



"Easy-to-use stand alone systems can free our customers to do what they do best."

We plan our intelligent products to expand upon many of the same time, cost, and labor saving benefits of graphics: by reducing routine processes, intelligence can keep each customer working at the decision-making level.

Our goal is to make each product as simple and personally manageable as possible. By understanding our customers and answering their applications one by one, we make our intelligent graphics products an extension of the mind.

The smartest thing about our personal computer is how well it works with its operator.

The desktop computer user expects an immediate comfort level. He looks for simplicity. An easy-to-use language. A familiar keyboard. And fast answers. So when we built our 4051 graphics system, we made it powerful enough to command a system of peripherals and to operate as an intelligent terminal. But we also designed it to be inherently simple to operate and easy to understand.

It is so consistent that once you've mastered it you don't have to live with a set of manuals.

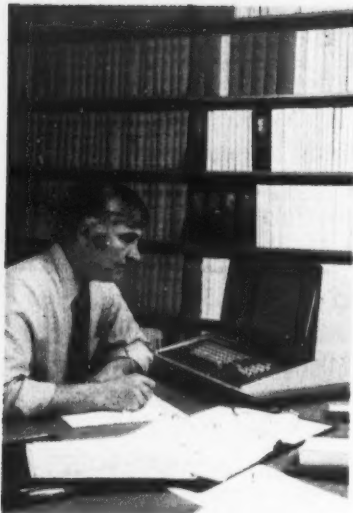
While designing a non-restrictive hardware package responsive to the expecta-

tions of most personal computer users, we've individualized software to specific users groups. Including utilities for sophisticated programmers. Easy application packages like Modeling & Reporting. A PLOT 50 library that includes statistics, mathematics and electrical engineering. Plus a business planning package that produces bar charts, pie charts and line graphs with little more input than the numbers themselves.

Customer needs are leading graphics intelligence into new territories.

Recognizing some major bottlenecks in the nearly universal engineering technique of finite element analysis, we designed the FEM181, a complete stand-alone applications package that can cut the long, arduous task of finite element modeling by up to two-thirds the time and cost.

You can be sure, too, that with Tektronix' customer orientation these future developments will be done not only with intelligence but with good common sense based on your future needs.



Personal computing is already improving decision-making information — not only in engineering and scientific environments, but on the desktops of corporate management.

"We saw the need to distribute information. Which is why we now lead the art of putting graphics on paper."

To the computer builder, graphics is just one more peripheral to his central system. But at Tektronix, we regard all our products as peripheral to the central idea of quality graphics solving customer needs.

...That's why peripherals like our plotters and hard copy are graphics leaders in their own right.

Take plotters. In 1976 we introduced the first smart B-size (11"x17") unit, and led the trend away from analog to digital devices, with the 4662. Its customer base ranges from advanced research environments to office timesharing systems.

The C-size plotter: Not just bigger. More versatile.

Now we are introducing a C-size (17"x22") plotter, the 4663. The thinking behind it, and inside it, is as advanced as it looks.

Although C-size plotters are now rare in printed circuit design, numeric control, civil engineering and drafting environments, much of their work can be done on a C-size work station...cutting time and costs significantly.

Many of our customers have already begun redefining their needs to fit the benefits of the C-size plotter alternative.

Its local intelligence distributes the graphic workload, and configures easily

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It offers increased character generation capability. Circular interpolation. Automatic paper advance. All in a flexible, easy-to-use package.

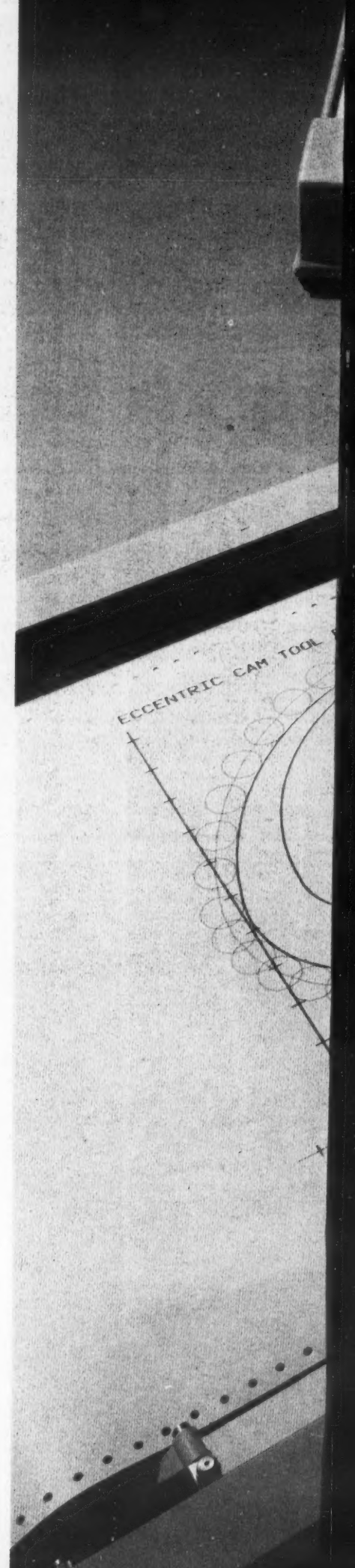
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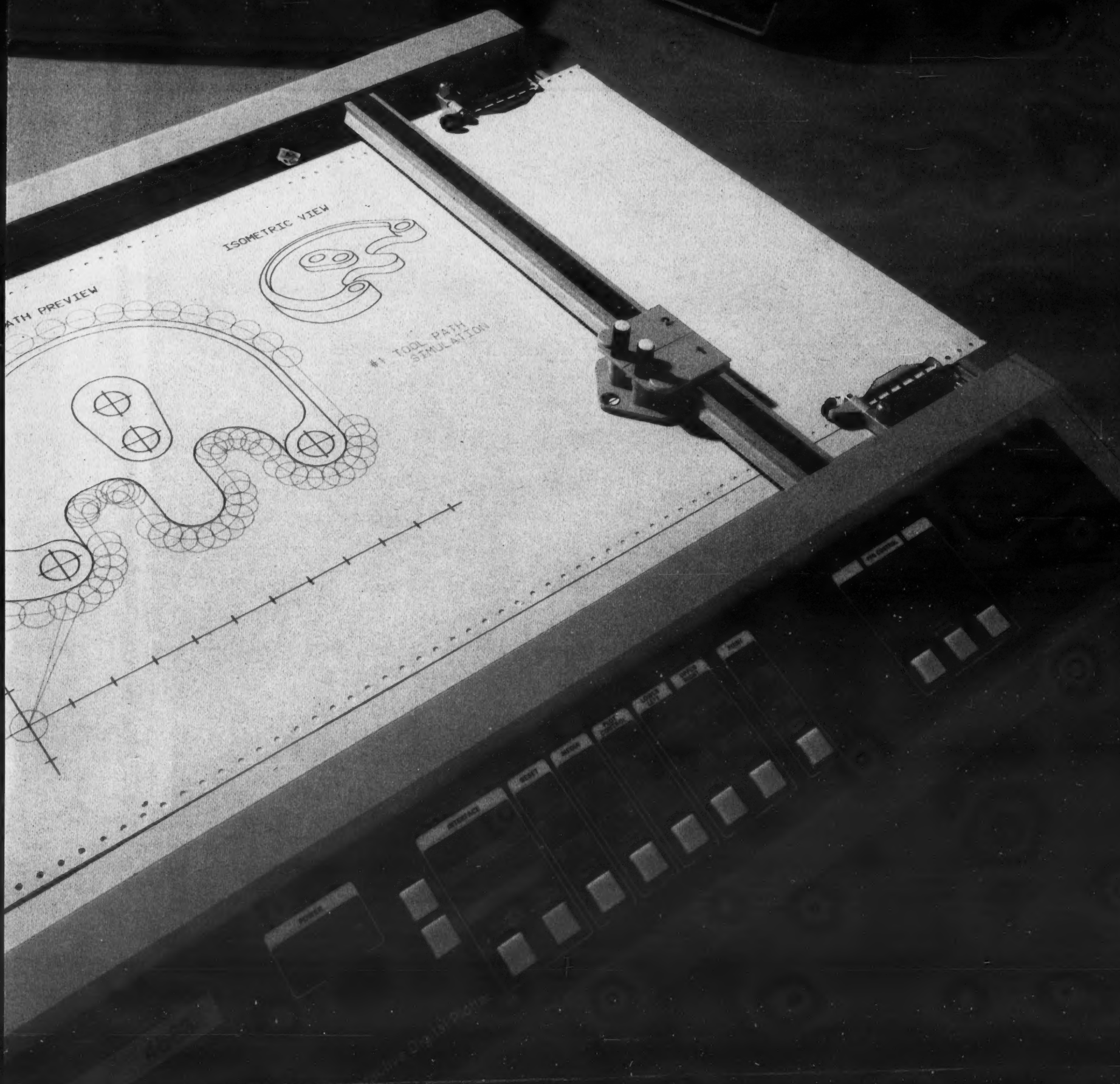
Our customers take for granted the fact that hard copy is now personal, quick, and economical. The more people can take us for granted, the better we're doing our job.



Tektronix digital plotters provide intelligence, precision and multi-color graphics to many applications needing permanent or camera-ready plots.



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"We sell the same thing to every system builder: a reliable and responsive partnership."

A few years ago, Tektronix committed itself to a separate organization specifically to serve the OEM needs of the system builder.

It was really the only way. Compared to other markets, many OEM needs are as different as night and day.

Or as different as today and tomorrow. Because what the system builder looks for, more than product reliability, are far-sighted technologies and long-term, close working relationships with their manufacturers.

Our responsibility to the system builder begins with an introduction to our graphics' concept and potential. It involves helping define needs and prove systems feasibility—often years in advance of actual OEM product purchase.

The GMA display series: our first graphics designed specifically for the systems builder.

Planning often includes our GMA modules: combining refresh and storage capability within the same tube, they bring our customers the high detail and economy of storage display, plus the dynamics of refresh. They are designed around a modular chassis that enables easy threading of system cables and addition of a wide range of optional components.

This modular approach helps many system builders cut costs by ordering custom configurations virtually

"off the shelf." At the same time, our engineers and manufacturing people are on-call to further tailor the product to meet individual needs.

Inherent to our OEM concept is upward-expandability. System builders who switch to our new 25-inch display, for example, will be able to do so with no modification to software, timing, or interfaces.

In the OEM market, corporate strength is also a product feature.

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You'll find too, that we value our OEM customers for many of the same reasons they value us. The benefits are truly reciprocal: it is through other innovators exercising our product concepts that we learn the full potential of our own technologies...and, in the long run, learn to make graphics better and better for the end user. That's what good partnerships are all about.



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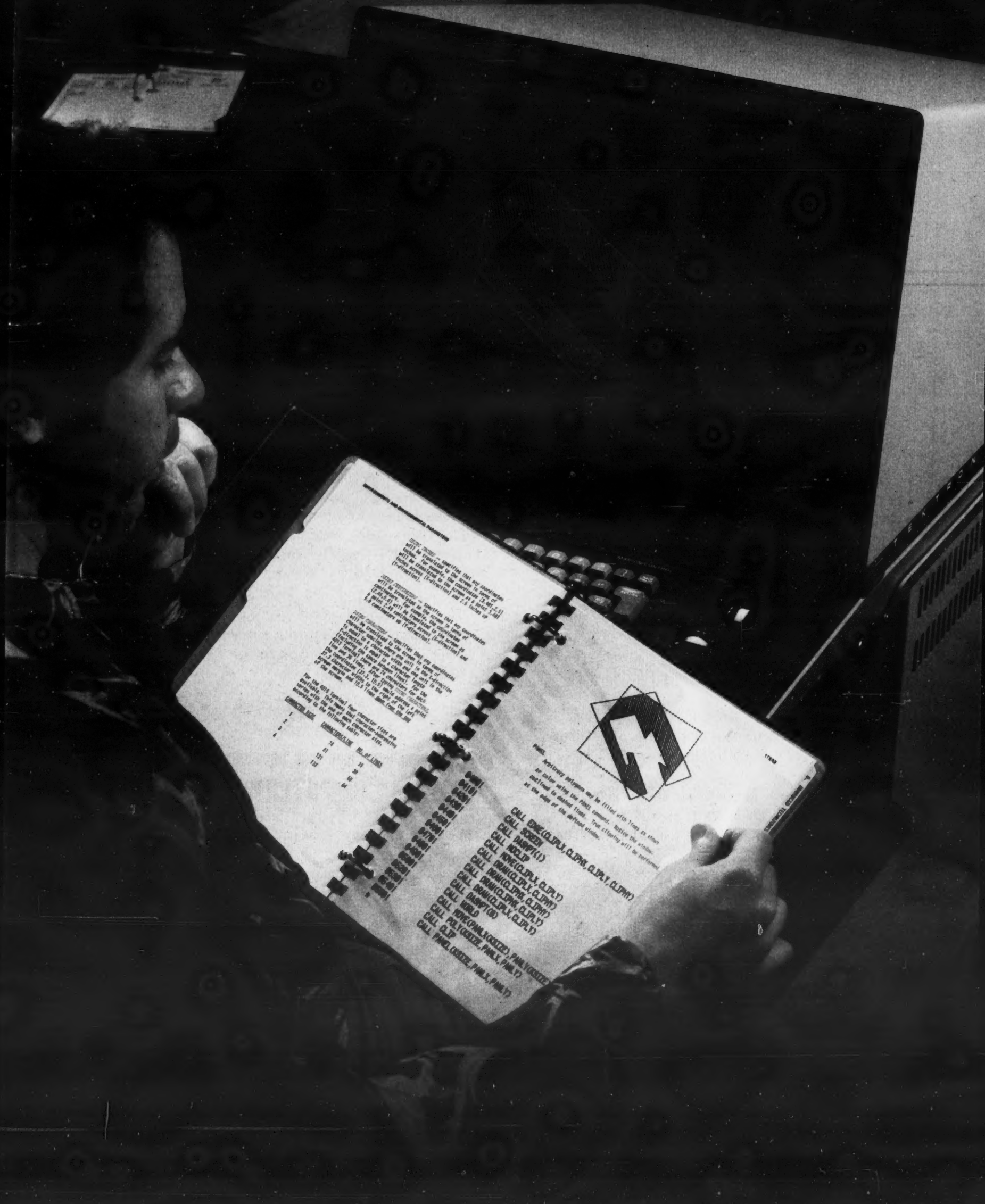
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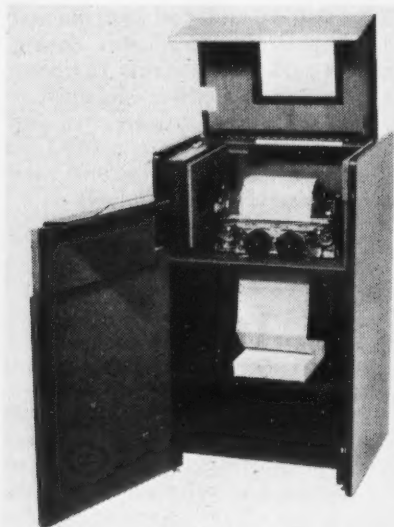
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ANAHEIM, Calif. — A line of 300 line/min printers will be exhibited by Innovative Electronics, Inc. in Booth 1723.

The Innovator family includes three



Innovator Printer

models offering both parallel and serial interfaces at prices formerly obtainable only by dot matrix printers, Innovative claimed.

The family features the Teletype Corp. 300 line/min tractor-feed Model 40, housed in a sound-reducing floor-mounted acoustic cabinet, the firm said.

Offerings include the Model 154 80-column; Model 202 132-column; and Model 250 72-column forms access printers. These printers provide for immediate access to a printed form, utilizing a tear bar to avoid waste of paper, according to Innovative.

Each character printed is fully formed, imprinted into the paper by a hammer for each column within a ro-

tating carrier belt. Up to six clear copies are possible with this design.

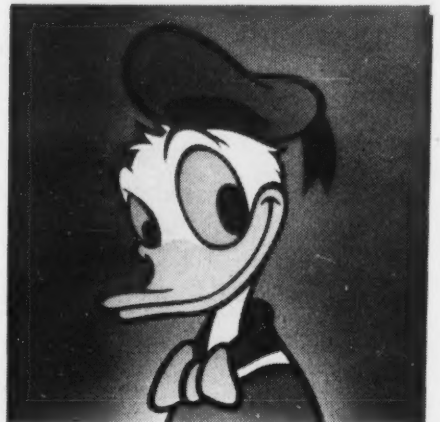
A variety of type carriers are available, the firm said, and interfaces are implemented by the Innovator controller board that is mounted within the cabinet.

Custom nonstandard sets may be generated for special applications, and print speeds up to 500 line/min may be

achieved using the optional IBM 1403 equivalent 48-char. set.

Noise-reducing properties of the Innovator cabinet are said to permit its use in office environments previously suited only to thermal printers.

The Model 154 costs \$3,600; the 202, \$4,300; and the 250, \$3,950, the firm said from 15200 N.W. 60th Ave. Miami Lakes, Fla. 33014.



The new MDS 21/50. Series 21 grows bigger for you.

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speeds. Best of all, Systems 21/20 and 21/40 can be expanded to the System 21/50.

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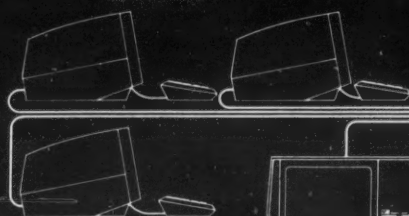
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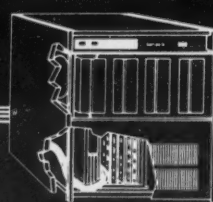
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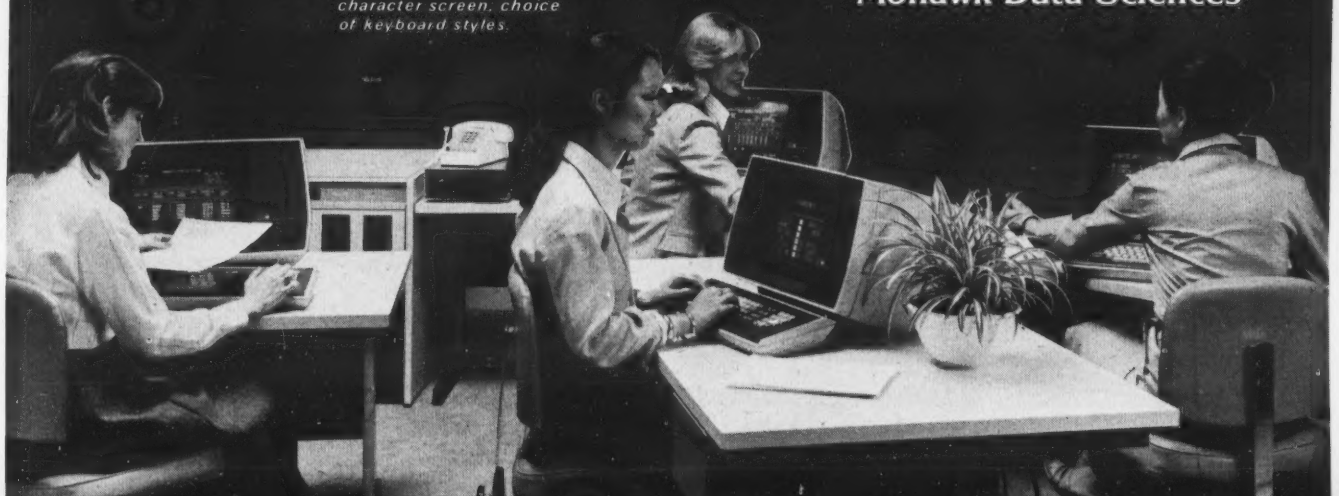
From 1 to 4 operator stations, each with 1920-character screen, choice of keyboard styles.

Addressograph-Multigraph Corp.

ANAHEIM, Calif. — Addressograph-Multigraph Corp.'s Bruning Model 1830 Micropublisher, a plain paper microfiche enlarger-printer, will be on display at Booth 1621.

The unit is said to be capable of producing copies at a rate of 900/hour, accepts standard 105 mm by 148 mm silver, diazo or vesicular microfiche and gives the user a choice of any three of seven standard formats, using reductions of 20X, 24X, 42X or 48X. The resulting "blow back" ranges from an 18:1 ratio for the 20X reductions to 44:1 for the 48X mode.

The 1830 meets copy legibility requirements of PCS MFT-2411 using sans serif microfont type and has a 16-key control panel, the company said from 20600 Chagrin Blvd., Cleveland, Ohio 44122.



MDS
Mohawk Data Sciences

Peripherals at NCC

Tally Corp.

ANAHEIM, Calif. — The Tally Corp., in Booth 1115 will display several models of serial dot matrix and line printers designed for the office environment.

The T-1000 series features microprocessor-controlled bidirectional printing at speeds from 40- to 200 line/min, the firm stated. The print head, controlled by ruby-jewel front bearings, is designed to accelerate to three times the printing speed while moving over a space and it is protected by an integral dust cover to guard against outside contaminants, Tally said.

Two rails hold the print head carriage in alignment to lock-in registration, and print quality is maintained by half-space matrix fonts, a spokesman stated. The unit also features a magnetic "pick-off" carriage return wheel

that provides positive servo feedback, eliminating light sources and sensors.

The T-1612, a 1,200 bit/sec printer terminal, incorporates 42 programmable keyboard functions. The unit has a 20-char. answerback capability and a multikey rollover feature if two keys are struck simultaneously.

The terminal offers a full 128-char. Ascii set, end-of-line warning and automatic paper-out detection functions.

An operator control panel with switches for power, data rate selection, local or off-line operation, half- or full-duplex mode, automatic line feed and automatic new line is also included.

The Model T-2000 line printer produces full 132-char. columns at 125- or 200 line/min. The printer employs a matrix scanning technique whereby the rotary stepping motor

motion is transformed into a linear horizontal scan motion. The dot matrix characters are generated one at a time by an oscillating print comb of 132 hammers, each with a steel ball impact face. Each hammer is pulled back by its own electromagnet and then released to fly forward, creating a dot.

The paper advances vertically and the process is repeated until the complete line matrix has been scanned, the company said.

The T-5000 is a 500 line/min dot matrix printer that features swing gate paper loading, dual tractor engagement above and below the print line

and a "helix" printing principle, the spokesman said. Printing is produced by the controlled interaction of a constant-speed rotating helix and 22 voice coil activated hammers. By keeping an electronic count of hammer and helix location, and by incremental stepper motor paper advance during the print cycle, a dot matrix character is formed, the spokesman explained.

The 132-column printer handles multipart forms from 4 in. to 16.75 in. wide, the firm noted. The unit uses industry-standard scroll ribbons.

The Tally Corp. is located at 8301 S. 180th St., Kent, Wash. 98031.

Documation, Inc.

ANAHEIM, Calif.— Documation, Inc. will use Booth 2363 to show a series of microprocessor-controlled impact printers intended for use as replacements for IBM printers, as well as for use by OEMs.

The two printers, called the DOC

1000 and the DOC 1200, each incorporate two 8080 microprocessors for reliability, according to a company spokesman. The microprocessors to-

Mag-Tek, Inc.

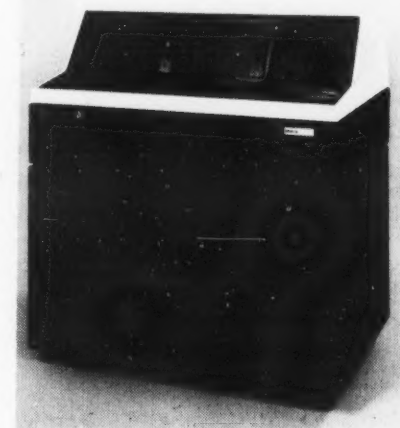
ANAHEIM, Calif.— Mag-Tek, Inc. will feature its magnetic stripe card readers and encoders as well as the MT-50 magnetic stripe card encoder in Booth 2612.

The MT-50 is available in two versions for encoding at either 75- or 210 bit/in. It is priced at \$1,450.

Mag-Tek will also show its MT-210 magnetic stripe card reader, which is available in five versions. With the MT-210, the user can choose which track or tracks of information he wishes to read, according to the company.

The MT-150 magnetic stripe card writer/reader, which is also being shown, is available in three versions for recording information on any of the standard data tracks.

The MT-210 reader starts at \$140 with OEM prices of \$38 per unit. Cost of the MT-150 writer/reader starts at \$350, with OEM prices at \$150 per



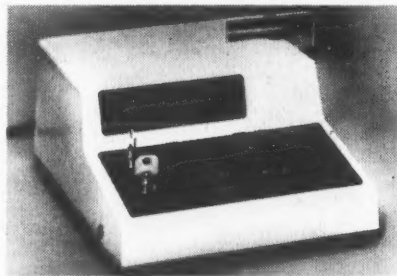
DOC 1000

gether maintain and execute printer functions from data transfer to forms movement.

The printers, rated at 1,000 line/min and 1,200 line/min respectively, are each available in three models: for compatibility with IBM 3211/3811 printers, IBM 1403/2821 printers and standard OEM interfaces. Both use a 48-character set and feature a fully buffered print line of 132 characters, Documation said.

Spacing and forms skipping for the Model I (3211/3811 compatible) is achieved by computer control through the forms control buffer, while the other two models use a punched carriage tape. Both printers are capable of operating at 6- or 8 line/in. with a slew rate of 50 in./sec. on all three models.

Forms capacity of the printers is 3 in. to 34 in. in length, and depth of 4 in. to 18-3/4 in. in width, with a maximum of six-part forms, a spokesman said. Other standard features include an acoustically insulated cover, interchangeable character arrays and a universal character set (UCS) buffer that allows all character sets, including OCR fonts, according to the firm at P.O. Box 1240, Melbourne, Fla. 32901.



Mag-Tek MT-50

unit.

The readers and encoders can be used in factory data collection, automatic gas dispensing and access control systems, according to the company at 20725 S. Annalee Ave., Carson, Calif. 90746.

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Peripherals at NCC

Applicon, Inc.

ANAHEIM, Calif. — A color plotter from Applicon, Inc. will be demonstrated at Booth 3219.

The plotter, which can generate graphics up to 22 in. by 34 in. in size is capable of resolution of

up to 125 point/in., according to the company.

Additional features include the ability to produce more than 15,000 shades of color under software control and the availability of a range of

software, a spokesman noted.

The color plotter sells for \$45,000 from the company at 154 Middlesex Tnpk., Burlington, Mass. 01803.

Techtran

ANAHEIM, Calif. — Six products will be displayed in Booth 2751 by Techtran Industries, Inc.

Microprocessor-based, mini-diskette systems featuring over 200K usable character storage, the Models 950 and 951 microdisks, will be demonstrated. The drives meet EIA RS-232 and 20mA standards and are plug-compatible, the company said, with prices starting at \$1,395.

Also to be presented will be three microprocessor-based data cassettes with standard RS-232 interfaces. The models 816, 817 and 818 have an optional Ansi/Ecma recording format which is said to provide total compatibility with a variety of systems. The recorders list for \$950.

A hand-held data recorder, the Porta 200, will also be shown. The unit can store up to 85,000 characters for a variety of applications.

The Porta 200 is priced at \$825, including batteries and charger, the spokesman said from 200 Commerce Drive, Rochester, N.Y. 14623.

Gould, Inc.

ANAHEIM, Calif. — Two electrostatic plotters will be exhibited in Booth 1107 by Gould, Inc. Instruments Division.

The first, the Gould 5400 electrostatic plotter, has a resolution of .010 in. (100 dot/in.) horizontally or vertically and can be used in generating "E" and larger size drawings.

The Gould Vector Plotter is multi-microprocessor based, according to the company, and therefore removes the vector-to-raster conversion task from the host system to the plotter.

Using the vector plotter, the mainframe need only generate and sectorize vectors, which means less CPU time, less main memory space, less mass storage space and fewer I/O operations. This approach also requires less tape for off-line plotting and uses less transmission time to remote systems, the firm said from 3631 Perkins Ave., Cleveland, Ohio 44114.

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Pussycat. Perkin-Elmer's \$795*, 100 cps CRT Page Printer.

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The Model 650 connects to any CRT terminal with an RS232 port—a Perkin-Elmer terminal or, perish the thought, someone else's. No need to replace existing hardware or software.

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And, if you're one of our competitors... Smile, when you say pussycat!

For more information, write Perkin-Elmer Data Systems Sales and Service Division, 106 Apple Street, Tinton Falls, New Jersey 07724 or telephone toll-free 1-800-631-2154.

*Quantity 75.

PERKIN-ELMER
Data Systems

Peripherals at NCC

Siemens Corp.

ANAHEIM, Calif. — Siemens Corp. will exhibit a high-speed version of its silent ink-jet PT 80 printer terminal in Booth 2343.

The PT-80i can operate at 270 char./sec and is bidirectional and microprocessor-controlled.

The printing head moves in relation to the text to be printed on the following line. The head, which includes the

12 ink-jet elements, can print in a 12 by 9 dot matrix from either one of two character generators and is free to choose character elements for printing logos, symbols or other graphics, according to the company.

The system uses an 8085 microprocessor and the control provides standard parallel interface of the original PT 80 as well as an extended system

information bus interface, Siemens said. The bus allows for the external connection of network selectors, data sets and additional storage devices such as floppy disks, it added.

The modular PT-80i uses paper from 8-1/2 in. through 14-7/8 in. in width.

For further information, contact Siemens Corp., 186 Wood Ave. South Iselin, N.J. 08830.



Xerox Corp.

ANAHEIM, Calif. — Xerox Corp. will show five products in Booth 1331. Two printing systems and three communications terminals will be displayed.

The Xerox 9700 electronic printing system is said to produce computer-generated text while creating business forms and other images at a rate of 2 page/sec. The 9700 prints on 8-1/2-in. by 11-in. cut sheet paper in on-line or off-line mode with a variety of standard vendor tape formats.

Forms, including logos, signatures and charts, are stored within the 9700 and imaged electronically with variable data. This eliminates the need for forms overlays and most preprinted forms, according to Xerox. Multiple forms, stored in digital format, are changeable on a page-to-page or copy-to-copy basis, the firm added.

Printing System

The firm will also show its 1200 series printing system. The 1200 is said to print forms and text at speeds up to 4,000 line/min. All models of the 1200 come with the firm's 416 processor.

The Xerox 1700 terminal is addressed to time-sharing users, offering Ascii-compatible APL and text processing. The 1720 terminal is designed for the scientific or administrative user requiring Ascii and/or 2741 code compatibility, the firm said, adding that both the 1700 and 1720 are 30 char./sec terminals using the Hytype II printing mechanism and featuring interchangeable printwheels in a variety of type fonts.

The Xerox 1760 terminal is a 200 char./sec, Ascii-compatible dot matrix impact printer offering automatic bidirectional printing. The 1760 is held suitable where high speed throughput from the terminal is essential.

The 1700, 1720 and 1760 offer conventional, absolute horizontal and vertical tabbing; certain forms handling features; upper and lower case printing; and a multiple copy capability, Xerox said, adding that these terminals can function as typewriters in off-line mode.

Xerox Corp. is located at 701 S. Aviation Blvd., El Segundo, Calif. 90245.

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A directory of names and addresses of more than 900 department chairmen and 1400 Computer Center Directors at colleges and universities in the United States and Canada, including degree programs offered and on-site computer equipment. The officers and key staff members of computer-related associations are also listed. 180 pages.

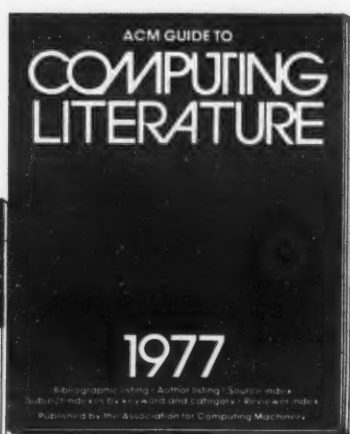
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PROCEEDINGS OF THE 1977 ACM ANNUAL CONFERENCE, SEATTLE, WASHINGTON, OCTOBER 17-19

The latest in ACM Annual Conference proceedings features 84 papers from sessions organized by the Special Interest Groups. The ACM Annual Conference is traditionally the reporting ground for the leading edge in applied computer research, covering a wide range of topics. This proceeding is noteworthy for its report on a proposed industry standard: the CODASYL Committee report on "A Data-base Language for FORTRAN." 516 pages.

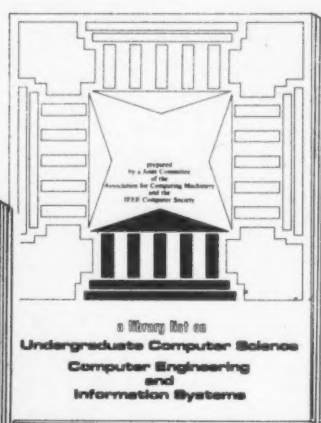
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A comprehensive list of Computer Science books which should be a part of library collections at schools offering undergraduate programs. Prepared by a joint committee of ACM and the IEEE Computer Society, the list is primarily composed of books published since 1968. 48 pages.

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Others: \$6.00

Companion Volume. ACM SIGCSE Special Issue on Computer Science Curricula, June, 1977. Includes (1) an update of "Curriculum 68," which is a working paper on undergraduate computer science curricula, and (2) a working paper on a Community and Junior college curriculum in computer programming. 36 pages.

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Peripherals at NCC

Okidata Corp.

ANAHEIM, Calif. — Okidata Corp. will exhibit its microprocessor-controlled 300-, 160- and 125 line/min printers in Booth 1319.

All of the printers include graphics capability, program-controlled font selection and a choice of plug-compatible interfaces, according to the firm.

Okidata will also demonstrate other minicomputer peripherals such as disk drives and a passbook printer.

The 132-column 300- and 160 line/min models print 7 by 7 characters and the 250- and 125 line/min units print 5 by 7 or 9 by 7 characters, according to the company.

Users may change fonts on command and can select from 12 different styles including true lower case, double height and double width. Microprocessor-based RS-232 and plug-compatible interfaces are available for many CRTs, minis and micros, Okidata claimed.

Graphics capabilities are offered and all systems include built-in diagnostics.

Okidata will also display its Model CP210 document/passbook printer, a table-top unit that adjusts automatically to accommodate documents and multipart forms of different sizes and thicknesses.

The unit, which has a fractional line feed, will print on both the document or passbook and an optional locked journal tape.

The CP210 will print 5 by 7 characters bidirectionally at 110 char./sec. Users may change fonts on command and select upper case, lower case or double width. An RS-232 interface

and built-in diagnostic capabilities are included, the firm said.

Two RS-232 interfaces have been added to the Model CP110 printer, the company noted. The CP110 prints a 5 by 7 character bidirectionally at 110 char./sec across an 80-column page. Fonts can be selected in upper and lower case and in double width and are changeable on command. The printer

also offers a choice of microprocessor-controlled interfaces in addition to the RS-232 option, the company said.

The Series 3300 disk drive has been expanded to 80M bytes and the moving head units use Okidata's rotary head positioner.

More information can be obtained from the firm at 111 Gaither Drive, Mount Laurel, N.J. 08054.



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Tri-Data Corp.

ANAHEIM, Calif. — The Flexifile 21, a microprocessor-controlled mini-disk system will be exhibited by the Tri-Data Corp. in Booth 4440.

The Flexifile 21 features a dual RS-232 interface and 8K memory expandable to 16K, according to the company.

A text edit software package is supplied with the unit, which adapts to time-sharing systems and includes insert, delete and search features.

The system is used in on-line data collection, off-line editing, program loading and secondary data storage. The Flexifile 21 also reduces line costs, remote computer storage and CPU access time, according to the company.

The random-access mini floppy features front panel flexibility, microprocessor control, user programmability, miniflexible disk media, interface capability and dual drive capability.

Available as a desktop unit or in rack-mounted configuration, it contains an 8080 microprocessor and Shugart minidrive and is priced at \$1,995.

For more information, contact Tri-Data Corp., 800 Maude Ave., Mountain View, Calif. 94043.

Peripherals at NCC

Kybe Corp.

ANAHEIM, Calif. — In Booth 2151, Kybe Corp. will show a computer tape cleaner for auto load banded reels that opens the band and threads the tape, then cleans, tests and stacks the tape back onto the reel in approximately 3.75 min, a spokesman for the firm said.

The SLT-80 removes dirt, dust and oxide particles that adhere to tape surfaces, causing signal dropouts and read/write errors, the firm stated. The system also reports the condition of the tape in question, computer-correlated at subcritical, nominal or hypercritical levels, it added.

The unit features a three-way cleaning system that incorporates a sapphire cleaning blade, auto-advancing tissues and a high-pressure vacuum. An ionized air barrier neutralizes the static charge to elimi-

nate attraction of debris, the firm noted. The system has a programmed read-only memory for control and an inkless chart recorder that monitors track dropouts, edge damage and tape footage.

Vacuum Cleaner

A tapered vacuum chamber works in conjunction with air bearings to isolate the tape from surface contact to minimize surface damage and wear, the company spokesman added.

Also to be demonstrated is the TMS-70, a tape management system; the TMS-77, a magnetic tape tester; the TMS-200, a tape certifier; the DP-10, -20 and -30 line of IBM-compatible disk pack cleaners; the Kybe/Weircliffe series of bulk tape erasers and the TC-225 cleaner, retensioner and rewinder.

Kybe also will show its "K" series of Accutrack cassettes. The cassettes feature a fiberglass-reinforced, interlocking case, computer-grade tape, low-friction slipsheets and tape rollers and custom-designed spring and foam pressure pads, according to the spokesman for the firm.

The cassettes also have a dual "write lockout" system consisting of removable plugs and permanently attached slides to guard against accidental tape erasure, the firm claimed.

The SLT-80 cleaner/tester is priced at \$13,100 with a delivery time averaging from 90- to 120 days, the firm said. The K series tapes range in price from \$4.30 to \$6.95 in quantities of 10 from the company at 132 Calvary St., Waltham, Mass. 02154.



Shugart Associates

ANAHEIM, Calif. — Shugart Associates will be demonstrating its SA4000 fixed disk drive in Booth 2445. The first rigid disk drive product to be offered by the company, it is available in 14.5M-byte and 29M-byte (unformatted) capacities, with an optional 144K bytes of additional head-per-track storage.

Features of the drive include a transfer rate of 7.1M bit/sec, a band actuator and capstan used to position the Winchester-type read/write heads and compatibility with the interface and controller for the company's line of floppy drives.

Prices for the 14.5M byte drive start at \$2,550 (in single quantities) and go down to \$1,325, in quantities of 250. The 29M byte version sells for \$3,500 and \$1,800 in the same quantities, from the company at 415 Oakmead Pkwy., Sunnyvale, Calif. 94086.

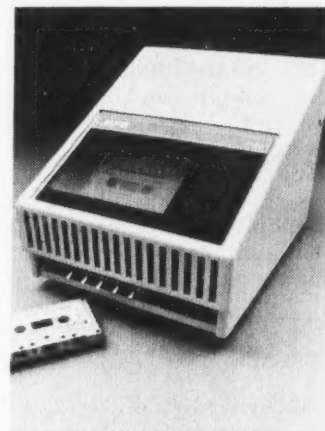
MFE Corp.

ANAHEIM, Calif. — Available for inspection at Booth 2159 will be MFE Corp.'s Model 2500 buffered data cassette terminal and its Model 450B digital cassette transport.

The microprocessor-based Model 2500 incorporates MFE's Model 450B tape drive, which allows recording on both sides of the tape, for a character capacity of 350,000, the firm said.

Ansi-compatible, the MFE 2500 is available with Texas Instruments, Inc. or NCR Corp. compatibility, selectable rates up to 2,400 bit/sec and binary mode. Also standard are teletypewriter and RS-232C interfaces, the firm said.

The Model 450B incorporates the "Tachlock" speed control system, providing 1% long-term speed accuracy at the heads in a reel-to-reel transport without the use of a prerecorded digital clock track, according to the firm. The 450B is Ansi/Ecma compatible. Two data tracks are available.



MFE Model 2500

The Model 2500 costs \$1,190. Price of the Model 450B is \$560, with delivery in four to six weeks. MFE Corp. is located at Keewaydin Drive, Salem, N.H. 03079.

Printronix, Inc.

ANAHEIM, Calif. — Attendees will be able to examine the Printronix 600 featured by Printronix, Inc. in Booth 3215.

The 600 line/min matrix impact line printer is similar to the 150- and 300 line/min printers offered by Printronix, according to the company.

The unit features raster matrix impact printing capabilities, multicopy print quality and a printing mechanism with up to 50% fewer parts

than drum, chain, belt or band printers, the company claimed.

The 600 printer also features full 96-char. set expandable to 160 characters without speed degradation and an inherent computer graphics/plotting capability.

Deliveries will begin late in the year, the company said. For more information, contact Printronix, Inc., 17421 Derian Ave., Irvine, Calif. 92714.

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Peripherals at NCC

Information Terminals Corp.

ANAHEIM, Calif. — Five products will be announced and exhibited by Information Terminals Corp. at Booth 1364.

The first of the products, a quad-density, 1/4-in. data cartridge providing four times the data storage capacity of a standard 1/4-in. data cartridge, is designated the Verbatim TC 400.

The cartridge can store approximate-

ly 10M bytes of data in formatted mode or 11.5M bytes unformatted, according to a company spokesman, making it suitable as a backup storage unit for post-Winchester generation fixed disk drives. Environments without professional computer operators should find the quad density cartridge usable since it is easier to use and less expensive than standard 1/2-in. mag-

netic tape, he added.

The quad density cartridges are tested for 6,400 bit/in. operation, according to the company, and are compatible with standard Ansi-Ecma 1/4-in. cartridge drives.

The second product is a data cartridge with 50% more storage capacity than a standard package, in the same physical space, the firm said. The cartridge can hold 4.3M bytes of data in Ansi/Ecma format, according to the company, on 450 feet of tape. The company plans to price the product approximately 33% higher than standard-length cartridges.

A double-sided, double-density diskette with storage capacity of .6M- to 1M-byte capacity (depending on formatting) will also be announced. Called the D² Minidisk, the product is said to be compatible with Shugart and other dual-head minidisk drives and is available in softsector, 10-sector and 16-sector versions.

The 5.25-in. diameter disk is also said to have an oxide formulated specifically for dual-drive applications.

The Verbatim D² diskette, a double-sided, double-density diskette suitable for use with IBM's 5110, System 34 and Series/1 and Shugart 850/851 will also be shown.

An additional product, the Verbatim MI-80 mini cassette, will also be displayed. The product is capable of storing 100K bytes formatted or 190K bytes unformatted on an 80 foot tape, according to the company.

Information Terminals Corp. is located at 323 Soquel Way, Sunnyvale, Calif. 94086.

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Qantex

ANAHEIM, Calif. — A ruggedized commercial tape transport for use with 3M Co.'s DC300A data cartridge will be exhibited by Qantex Division of North Atlantic Industries, Inc. in Booth 1213.

Using the Model 650 tape transport a memory module can store up to 23M bytes of unformatted data on the 4-track DC300A cartridge tape, the firm said.

The transport is said to provide a tape speed of 30 in./sec and a recording density of 1600 Ansi-compatible bit/in., yielding a data transfer rate of 48,000 bit/sec.

Qantex said this throughput rate is such that a typical CRT terminal can be "filled up" in about half a second, contrasting with a conventional CRT "fill-up" time of several seconds.

The Model 650 drives the tape at 90 in./sec for rewind or fast search.

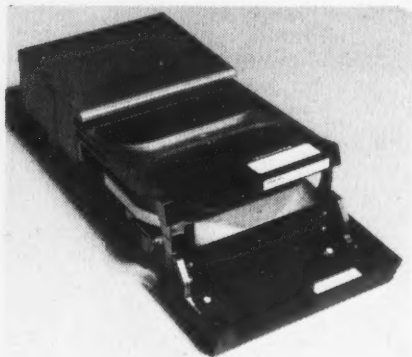
The Qantex Model 650 with operating electronics costs \$920; but the unit can be purchased as a simple electro-mechanical transport — omitting servo/data card and control/housekeeping boards — for \$475, the firm said from 200 Terminal Drive, Plainview, N.Y. 11803.

Peripherals at NCC

Bull Corp. Of America

ANAHEIM, Calif. — Three disk-related products will be demonstrated in Booth 1758 by Bull Corp. of America, the wholly owned subsidiary in the U.S. of CII-Honeywell Bull in Paris.

The D120 Mididisk drive is a 10M-byte (preformatted), two-head drive with 50 sector/track. The drive uses standard grade, IBM 3336-type re-



Model D120

cording media to record on two surfaces at a density of 4,750 bit/in. and is priced at \$3,000 (less power supply).

The D140 Mididisk drive reportedly has the same specifications as the D120, with twice as much capacity — 10M bytes of fixed storage and 10M bytes for the removable disk. Like the 120, it has a transfer rate of 920k byte/sec. Prices start at \$3,900, less power supply.

Also to be demonstrated is a controller for both drives, the firm noted from 200 Smith St., Waltham, Mass. 02154.

Zeta Research

ANAHEIM, Calif.— A micro-computer-based controller that when combined with a plotter can be preprogrammed for random plotting sequences or multiple copies will be demonstrated by Zeta Research in Booth 4118.

The Model 6300 controller, compatible with the firm's line of plotting stations, incorporates four microcomputers as system components, the firm noted. The controller consists of a tape transport and control electronics along with an operator console and CRT terminal control.

RS-232 Interface

A communications interface provides the ability to write tapes on the system via RS-232 lines and then, without removing the tape, plot off-line. The graphic machine language (GML) software is provided by the firm.

Error correction is provided so that the plot data may be recorded, corrected and then plotted off-line under operator control.

The 6300 is priced at \$13,500 from Zeta Research, located at 2300 Stanwell Drive, Concord, Calif. 94520.

Tandberg Data, Inc.

ANAHEIM, Calif. — Tandberg Data, Inc. plans to exhibit its TDC 3000 digital cartridge recorder, its TDI 1050 synchronous tape transport and modifications of these two products to make them suitable for use as call detail recording systems (CDR 3000 and CDR 1050) in Booth 1149.

The TDC 3000 digital cartridge recorder is a storage device for serial data. The medium is 3M Co.'s

DC300A data cartridge with 1/4-in. tape and a capacity of up to 2.5M characters. The product complies with Ansi/Ecma/ISO standards.

The TDI 1050 tape transport is designed for reels of up to 10.5 in. One design encompasses 7-track, 9-track, NRZI and phase-encoded (PE) formats, the firm said.

It utilizes a data density of 1,600 char./in. PE or 800-, 556- or 200 char./

in. NRZI at speeds of 12.5- to 45 in./sec, with an average rewind speed of 200 in./sec, the firm said.

The basic TDC 3000 is priced at \$1,900 and the basic TDI 1050 costs \$3,400. The CDR 3000 is priced at \$4,500 for a single unit and \$6,000 for a dual-drive unit. The CDR 1050 costs \$11,000. Tandberg Data, Inc. is located at 3593 Fifth Ave., San Diego, Calif. 92103.



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See us at NCC Booth #1732

Peripherals at NCC

Key Tronic Corp.

ANAHEIM, Calif. — An optical character recognition (OCR) device manufactured by Key Tronic Corp. will be exhibited in Booth 1155.

Called Datareader, the device is aimed at banking applications such as scanning credit cards and personal checks.

The firm noted that 24 to 36 digits must be manually key-entered to complete the data entry portion of credit card processing: account numbers consisting of up to 16 digits plus the date (six digits maximum); the six-digit Authorization Code; and the total dollar amount (six digits maximum, usually four). The Datareader is an economical alternative to manual key entry that increases the data capture rate, a spokesman for the firm claimed.

With the read and key method, time is saved by auto-

matic handling of sales drafts, Key Tronic said, explaining that this procedure frees the operator from unnecessary document handling. Sales drafts are transported through the Datareader while the account number is scanned by the OCR read head, reducing the number of required key strokes by approximately 50%, according to the spokesman.

Automatic Transport

After the account number has been optically read, the document is automatically transported to a viewing area where the operator can key in the remaining data. In most cases, the operator is required to key in only the dollar amount and authorization code. The Datareader allows documents to be processed in one pass using Read and Key,

Key Tronic asserted.

Check digit routines are said to be performed internally to ensure transmission of good data. If an error occurs, the document can be corrected on-line through an operator-prompting routine or sorted to a reject tray.

Throughput Doubled

The Datareader reportedly doubles the throughput of an individual operator in this application and offers dollar savings while the equipment is paid for. The product is backed by a Key Tronic guarantee that if operator throughput is not doubled without conversion costs, the user may return the system within 90 days after delivery at no cost, the firm said. Key Tronic can be reached through P.O. Box 14687, Spokane, Wash. 99214.

Dataproducts Corp.

ANAHEIM, Calif. — Dataproducts Corp. will introduce the latest member of its B series of line printers, the Model B-600 band printer, in Booth 1562.

The printer uses a steel band font carrier, the patented

12-channel vertical format units, a forms-length select switch, parity check, an elapsed time meter, automatic line feed, long-line drivers and receivers and ground isolation.

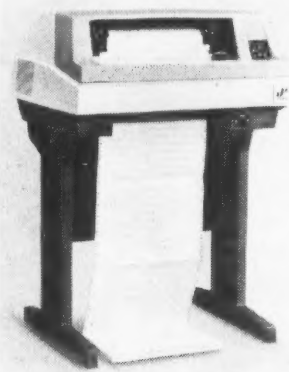
Line Printers Series

Dataproducts will also be showing its 2200 series of line printers, including the models 2230, 2260 and 2290. These printers are interchangeable and interface-compatible, allowing print rates of 300-, 600- and 900 line/min, respectively, using a 64-char. set in a 136-column format, the company said.

Also on display at the firm's booth will be the M-200 matrix printer with a bidirectional print speed of 340 char./sec and throughput of 125 line/min at 132 char./line, 200 line/min at 80 char./line and 300 line/min at 40 char./line. The printer has an 8 bit-parallel standard interface.

The company's T-80 thermal printer will also be shown. The printer has a print speed of 80 char./sec, a standard serial RS-232 interface, an optional parallel interface, a 5 by 7 matrix font, and a 64-char. Ascii set.

Dataproducts is located at 6219 De Soto Ave., Woodland Hills, Calif. 91365.



Model B-600

Mark V hammer system, custom integrated circuit hammer drivers and microprogrammed control to produce 600 line/min throughput, the company said.

The printer will complement the Model B-300, a 300 line/min printer, and will be useful in applications such as small and medium-sized business systems and batch terminals, according to a spokesman.

Options include either direct access or tape-controlled

General Electric Co.

ANAHEIM, Calif. — The General Electric Co. in Booth 4309 will demonstrate its series of interactive and microprocessor-controlled line printers.

The Terminet 200 line of matrix printers feature servo control for both carriage and paper advance, a 20 in./sec slew rate, a 1K buffer, multipart forms printing, 136 column print positions with variable character spacing, vernier tractor adjustment for fine tuning paper and the ability to handle paper widths from 2 in. to 16.5 in., a spokesman said. The line printer version also features a bidirectional printing capability.

The units also have a ballistic firing function and a laminated core for reduced heat. The printhead is operator-replaceable and has a 7 by 9 matrix printing format, the firm noted.

A nonvolatile semiconductor memory module can be added to the interactive model that includes a multichannel

128-position vertical format unit, both keyboard and remote source programmable; horizontal tabbing; and an 85-char. answerback, the firm explained.

A self-test feature is available on the line printer, which generates a preset test pattern, and the ribbon mechanism on the printer is motor-driven to prevent excessive ribbon wear, the spokesman stated.

Peripherals Offered

Peripherals include paper tape, a stand-alone magnetic tape terminal and a diskette storage terminal. An RS-232C data set control, line control, numeric cluster and memory module are also offered as options.

The interactive printer with keyboard is priced at \$3,325 and the line printer costs \$3,325. A forms control option is also available separately from the company's Data Communications Products Department, Waynesboro, Va. 22980.

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Minis at NCC

Diva, Inc.

ANAHEIM, Calif. — Shown in Booth 4323 will be Digi-Data Corp.'s Model 75 IPS tension arm magnetic tape transport and the microprocessor-based imbedded NRZI/PE formatter. Also shown will be the firm's 7-, 8.5- and 10.5-in. tape transports, current NRZI and PE formatters, dual buffered tape system and the firm's Nova, PDP-11 and HP 2100 interfaces.

According to the firm, the unique feature of the imbedded formatter is the use of a programmable microprocessor with a 400-step NRZI or 800-step NRZI/PE instruction set to perform the functions that "previously required dozens of integrated circuit chips." The microprocessor can control timing and data paths; generate and check file marks, check characters, pre- and postambles; confirm validity of data transfers; and monitor and act in response to the legality of commands, according to the firm.

The Digi-Data Dual Format-

ter is intended to mount in the firm's line of 7-, 8.5- and 10.5-in. tape drives. It can generate IBM- and Ansi-

compatible NRZI and PE tapes and can control four tape drives with any combination of two tape speeds, 9- or

7-track recording, 1,600- or 800 bit/in. in 9-track, and two selected densities in 7-track (800-, 556- or 200 bit/in.), the

firm said.

Digi-Data Corp. is at 8580 Dorsey Run Road, Jessup, Md. 20794.

Digi-Data Corp.

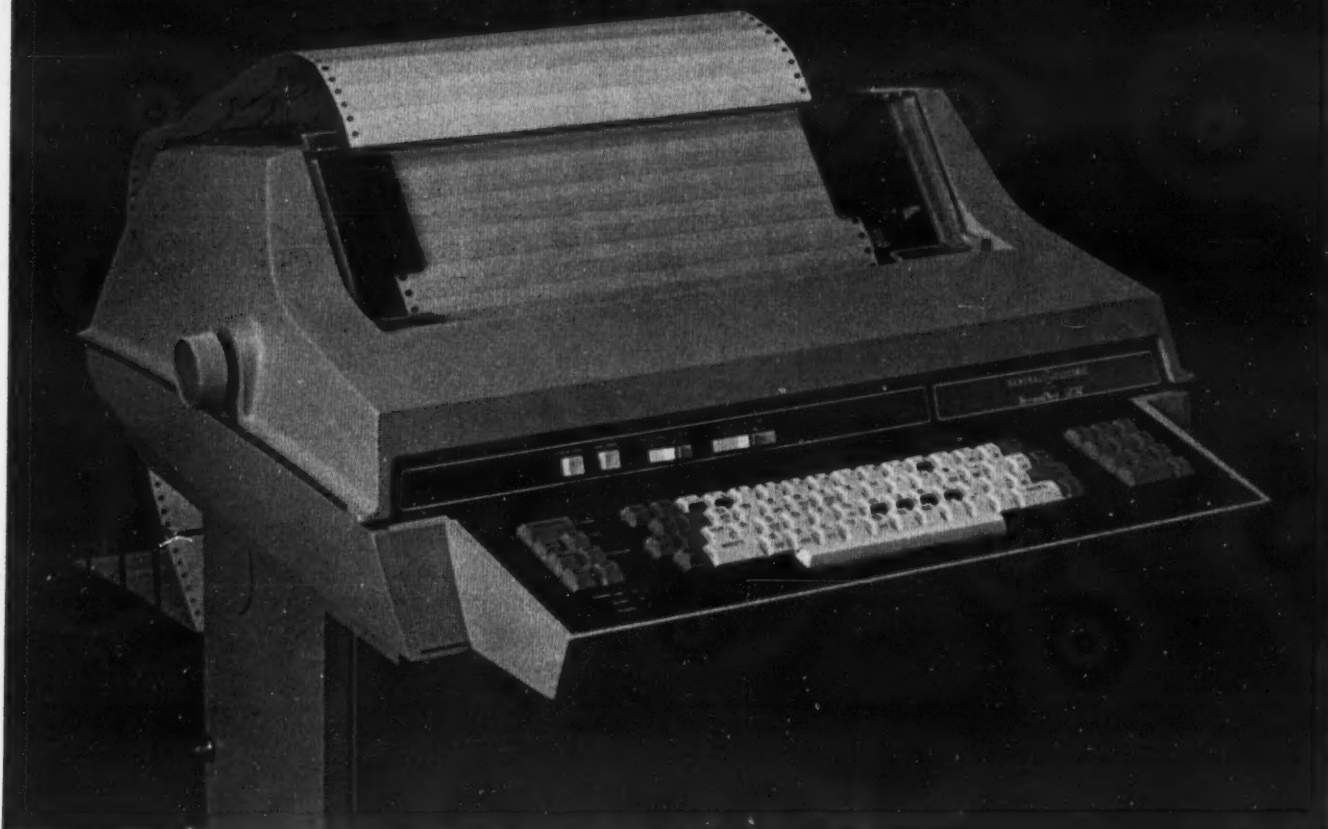
ANAHEIM, Calif. — A disk storage system for Digital Equipment Corp. PDP-11 processors, capable of providing 80 million to 300 million bytes of disk storage, will be demonstrated by Diva, Inc. in Booth 4123.

Called the DD-70 series, the system consists of a microprocessor-based disk controller, a four-board PDP-11/70 interface replacing the DEC RH70 Massbus, and a choice of disk drives in the range of 80M to 300M bytes per spindle. It is designed to be a functional replacement for the DEC RP04 or RP06 drives, according to a company spokesman, who added that systems providing a 50% faster disk transfer rate than presently available are also being sold by the company.

Features of the system include error correction for both header and data fields, transfer rates to 1,209K byte/sec and a series of self-test diagnostics.

Single-drive systems start at \$22,000 and additional add-on drives at \$10,000 from the company at 607 Industrial Way West, Eatontown, N.J. 07724.

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Minis at NCC

Randal Data Systems

ANAHEIM, Calif. — Randal Data Systems, Inc. will show five mini-computer-based systems in Booth 2464.

The Link 140 features a 1.2M-char. floppy disk drive and a 30 char./sec teleprinter input station. The 140 sells for as low as \$13,350 and costs \$13,900 including a CRT display terminal and 110 char./sec printer.

Accommodating up to five users simultaneously, the Link 240 is claimed to be among the least expensive hard

the firm.

The Link 550 comes with three terminals and a 110 char./sec printer, can handle 10 simultaneous users, can drive several printers simultaneously and costs \$44,900 using Rtos II, Randal said.

Randal Data Systems, Inc. is located at 365 Maple Ave., Torrance, Calif. 90503.



Randal Link 240

disk systems offered in the U.S., priced at \$22,900 with CRT terminal and 110 char./sec printer.

The Link 250 can handle 10 users simultaneously, has an internal storage capacity of from 64K to 128K bytes and is supported by the partitioned Randal Time-Sharing Operating System II (Rtos II), Randal said. The 250 base price is \$27,500.

The Link 540 offers a 50M-char. disk drive, can handle five simultaneous users, uses the nonpartitioned Rtos I and costs \$37,900 with a 110 char./sec printer, according to a spokesman for

Logical Machine

ANAHEIM, Calif. — A voice recognition and response unit called Mike will be shown by Logical Machine Corp. in Booth 1227. Mike is designed to be used in conjunction with Adam, a small business system instructable in English, the firm said.

The business owner can speak to Adam via a microphone and receive either a printed report, screen display or voice response, according to the firm. Mike may be used to access Adam's data, such as management financial figures, inventory status, order records, credit checks or year-to-date sales. Mike may be used to enter data into Adam's files and can confirm inputs verbally to ensure accurate data entry, the firm said.

Mike is designed to learn and recognize a user-specified vocabulary consisting of up to 16 words or phrases. Adam can store multiple vocabulary sets of 16 words that can be recalled upon voice or keyboard command, a spokesman added.

Logical Machine Corp. is located at 1294 Hammerwood Ave., Sunnyvale, Calif. 94086.

Digital Equipment Corp.

ANAHEIM, Calif. — Two of the featured items to be demonstrated by Digital Equipment Corp. in Booth 4123 will be the Decsystem 2020 and the company's VAX-11/780. In addition, three new disk storage peripherals and the company's Decnet computer networking software will also be demonstrated, the firm said.

The three disks to be exhibited, the

RL01, RK07 and RM02, range in capacity from 5M- through 67M bytes. All three are designed to work with DEC's PDP-11 family. In addition to PDP-11 compatibility, the RL01 also works with the PDP-8 family and the RK07 with the VAX-11/780, which is a 32-bit system.

DEC can be reached in Maynard, Mass. 01754.

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Minis at NCC

Basic/Four Corp.

ANAHEIM, Calif. — Basic/Four Corp. will be demonstrating two of its business systems in Booth 4201.

The first, the Model 600 is a transaction processing system designed for users requiring a large storage capacity, according to the company. The 610 features 35M bytes of disk storage, expandable to 105M bytes in three disk drives, a 40K semiconductor memory,

a 165 char./sec printer and a CRT terminal. Software includes an inquiry/reporting system called Easy, which the company said is designed to produce special reports on a one-time basis and a Tri-state Language Processor said to retain the on-line programming advantages of an interpreter, while offering the execution time associated with a compiler.

The 610 is microprocessor-based, as are all the company's products, a spokesman said, and is designed to execute programs written in business Basic.

Prices for the unit begin at \$51,400.

Also on display will be the System 200, which consists of a Basic/Four-manufactured CPU, 32K memory, 10M-byte fixed-media Winchester-

type drive, a CRT terminal, a cartridge tape drive and a 120 char./sec bidirectional printer.

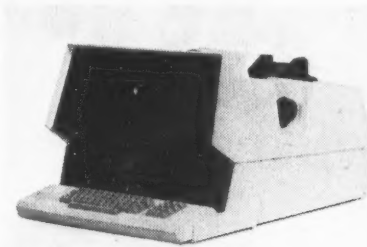
Basic/Four can be reached through P.O. Box C-11921, Santa Ana, Calif. 92711.



General Robotics Corp.

ANAHEIM, Calif. — The MVT/X3 desktop system will be the highlight of General Robotics Corp.'s display at Booth 2602.

The MVT/X3 includes a Digital Equipment Corp. LSI-11, 62K bytes of random-access memory (RAM), a line printer, keyboard, three mini floppy

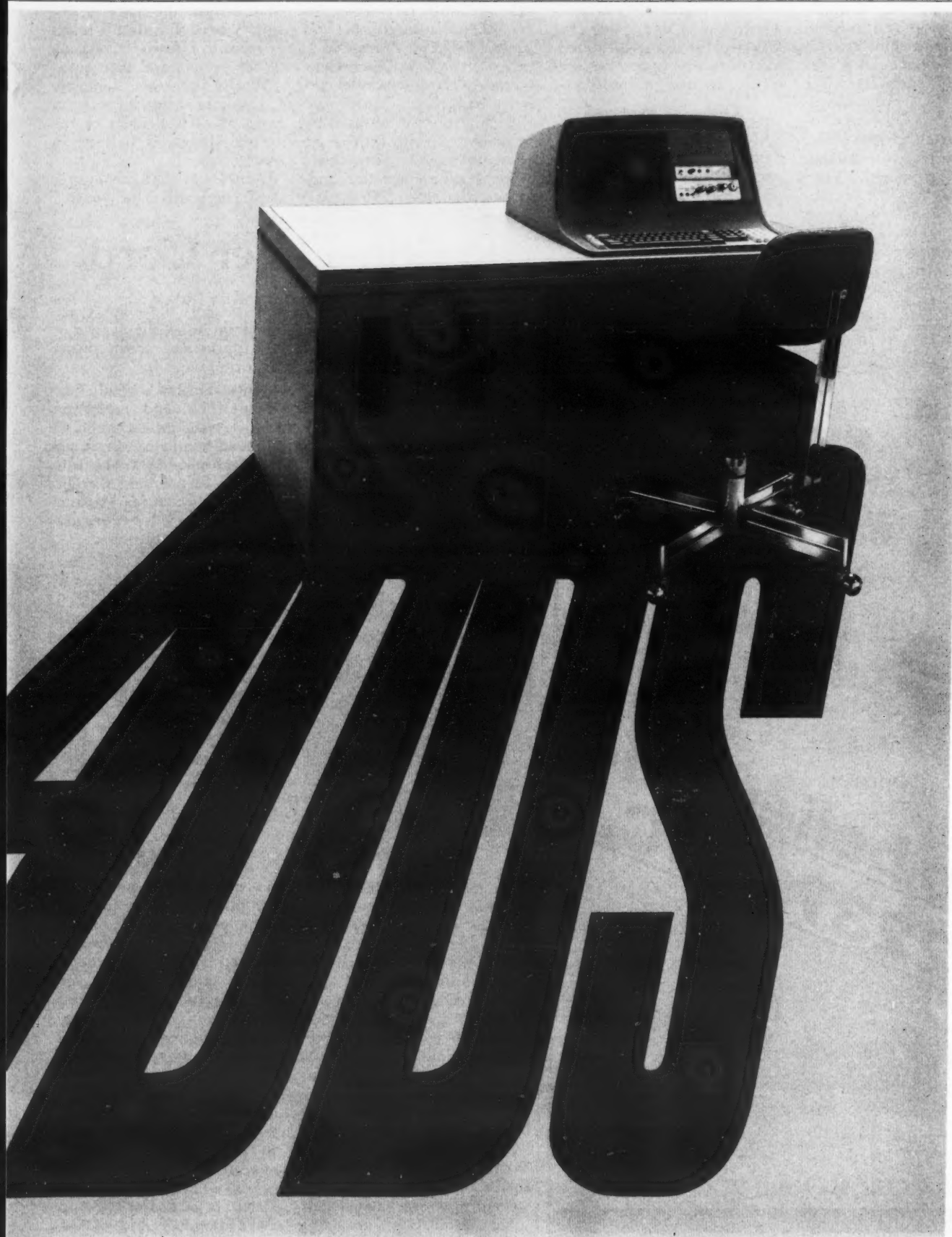


MVT/X3 System

disks, an operating system and a 12-line by 40-character display, the firm said.

The LSI-11 CPU is packaged in an 8 quad slot backplane and floating-point arithmetic hardware is a standard feature. According to the firm, the normal configuration has nine additional dual-height Qbus slots for user expansion. The MOS RAM has an access time of 450 nsec.

The MVT/X3 is priced at \$12,000. General Robotics Corp. is located at 57 N. Main St., Hartford, Wis. 53027.



Minis at NCC

Qantel Corp.

ANAHEIM, Calif. — Qantel Corp. will exhibit its System 210, 900, 950 and 1400 business computer systems in Booth 4231.

The 210 is called an entry-level business system specifically designed to bring all the advantages of automation to first-time computer users. The basic configuration includes a business-oriented CPU, 16K bytes of user-dedicated memory, a 27-line by 64-char. video display, a keyboard, a random-access dual disk drive able to store 1.3M alphanumeric or 2.6M numeric characters and built-in expansion space.

The 900 features a business-oriented CPU, 6K bytes of user-dedicated memory, a video display, a random-access disk drive able to store 6M char., a 45 char./sec serial output printer and built-in ex-

pansion space, the firm said.

The 950 offers multiuser capabilities and is said to feature all attributes of the 900 except that it incorporates an extended memory capacity of 8K bytes, according to Qantel.

Stand-Alone or in Net

The 1400 is said to handle all of the computing requirements of small to medium-sized businesses and to function as a stand-alone host or satellite processor in a distributed DP network. The 1400 features a business-oriented CPU, 16K bytes of user-dedicated main memory, two video displays, a random-access disk drive with a storage capacity of 25M characters, a 300 line/min printer, a 45 in./sec magnetic tape unit and built-in expansion space.

The Business Executive System for Time-Sharing (Best)

support the 210, 900, 950 and 1400.

When a file is created, Best assigns a small disk area for its data. As records are added, the file expands automatically; and when records are deleted, unused disk area is returned to a pool for reuse, the firm maintained.

Dynamic storage allocation relieves programmers of tedious mapping and remapping disk storage areas to accommodate changing user requirements, the firm continued.

Qicbasic Language

Also available with these models is Qicbasic, a business programming language described as similar to the well-known Basic developed at Dartmouth College. Qantel said Qicbasic has more sophisticated file handling and printing capabilities than conven-

tional Basic and was designed for business applications.

A series of Qantel-developed and supported applications program modules is available for installation with these models on an as-is basis. The series includes the following modules; order entry, purchase orders, payroll, inventory management, sales statistics, accounts receivable, invoicing, accounts payable and general ledger, the firm said.

Also available is Report Generator, a conversational inquiry language. Qantel said this language can be used by businessmen with little or no programming experience through simple question-and-answer dialogue. The Report

Generator user can specify data file for use, information to be printed, the criteria by which to select items for printing, the order in which to print the items, items that contribute to report totals and the report title.

Qantel's Program Generator also addresses the 210, 900, 950 and 1400. The feature is said to lead the systems designer through a simple series of steps to create an overview of the system and then automatically generate complete Qicbasic programs to perform tasks as each element of the system design is defined in more detail.

Qantel is at 3525 Breakwater Ave., Hayward, Calif. 94545.

Perkin-Elmer Corp.

ANAHEIM, Calif. — Perkin-Elmer Corp. will show a variety of products in Booth 2430.

The firm will exhibit its Interdata business systems, the Pack system, the Owl 1200 editing terminal, the Pussycat 650 CRT page printer with graphics, a Wangco 14 tape drive, a Model 82 microfloppy, a Model 76 standard floppy and other products.



Interdata 700

The Interdata Business System was designed around the 32-bit minicomputers of Perkin-Elmer's Interdata division. The Interdata Transaction Controller (ITC) lets users develop, implement and maintain on-line transaction processing systems, the firm claimed, noting that ITC is Cobol-compatible with interactive screen formatting and on-line screen form testing capabilities.

The Interdata Pack system is available in 16- or 32-bit configurations. This is a packaged system for use immediately upon installation, providing

the user with the ability to expand or tailor the system to his particular environment, the firm said.

Perkin-Elmer's Owl and Pussycat CPUs and the firm's Model 1100 interactive CRT terminal handle up to six major European language sets, such as French and Cyrillic, including accent marks, symbols and character configurations, the firm continued.

The Pussycat CRT page printer reportedly outputs an 80-column by 24-line page at the rate of 100 char./sec with its sideways printing fixed heads. Available with double buffering, the Pussycat can accept output from the unbuffered printer ports.

Perkin-Elmer's Smart Connection, consisting of a CRT and Pussycat printer, is aimed at potential users of Decwriter-type equipment.

The Model 14 125 in./sec magnetic tape drive from Perkin-Elmer's Wangco division features low power consumption and gentle tape handling and is designed for easy use and maintenance, the firm claimed. The Model 14 includes automatic loading and threading with IBM Easyload cartridges.

The Model 82 microfloppy disk drive offers a single drive configuration, optional extra track, double-density and double-sided recording. Positive loading interlocks are said to provide extra protection against diskette damage.

Perkin-Elmer's Data Systems Group is located at 106 Apple St., Tinton Falls, N.J. 07724.

Hazeltine's done it!

**Seeing is believing.
Booth 2237, NCC.**



Minis at NCC

Decision Data Computer Corp.

ANAHEIM, Calif. — The Decision Data Computer Corp. System/4, introduced last fall, will be shown in Booth 1635. This appearance will be the first public demonstration of the computer on the West Coast.

The System/4 is a microprocessor-based business system that offers concurrent batch and interactive operations, RPG-II and tutorial processing. The I/O devices available include disk, IBM-compatible diskette, serial and line printers, data recorders, CRT workstations and communications equipment, the company said.

Other products Decision Data will display for the first time on the West Coast are the Model 3240 printer terminal and 6540 serial printer, which were introduced at the same time as the System/4. The 3240 terminal is being marketed as a time-sharing terminal, system console or console/output printer for minicomputers or small business systems.

The CS 780 data communications terminal will also be shown. According to the company, the unit was designed to emulate the IBM 2780 and combines basic batch terminal capabilities with card data entry to produce a "workstation" effect that includes key-punching, verifying, card reading, punching and interpreting and line printing at rates up to 900 line/min.

Decision Data's display will also in-

clude demonstrations of its line printers, which provide IBM System/3 and 360 and 370 users with printing at rates up to 1,500 line/min.

Purchase prices on the System/4 range from \$19,305 to \$80,000 with monthly lease rates from \$680 to \$2,770. The purchase prices on the 3240/6540 range from \$2,395 to \$2,850 with monthly lease rates from

\$78 to \$125.

The CS 780 starts at \$14,320 to \$36,790 with monthly lease rates from \$482 to \$1,471. The 6600 series printers range in price from \$9,000 to \$41,175 with monthly lease rates from \$290 to \$1,675.

Monthly rates include maintenance service, the company said from 100 Witmer Road, Horsham, Pa. 19044.



Mostek Corp.

ANAHEIM, Calif. — Mostek Corp. will introduce three add-on memory systems for Digital Equipment Corp. and Data General Corp. minis in Booth 1531.

These will include a 128-word 16/21 bit add-on memory system for DG's Eclipse, which will cost \$4,800 for a 32K by 16 single card system with OEM discounts available. Capacity options are 8K, 16K, 32K, 64K and 128K words by 16 bits, Mostek said.

Also introduced will be an upgraded DEC PDP-11 add-on memory system designated the MK 8011. The series will feature a write access time of 150 nsec, plus optional on-board parity generation and checking, the firm said.

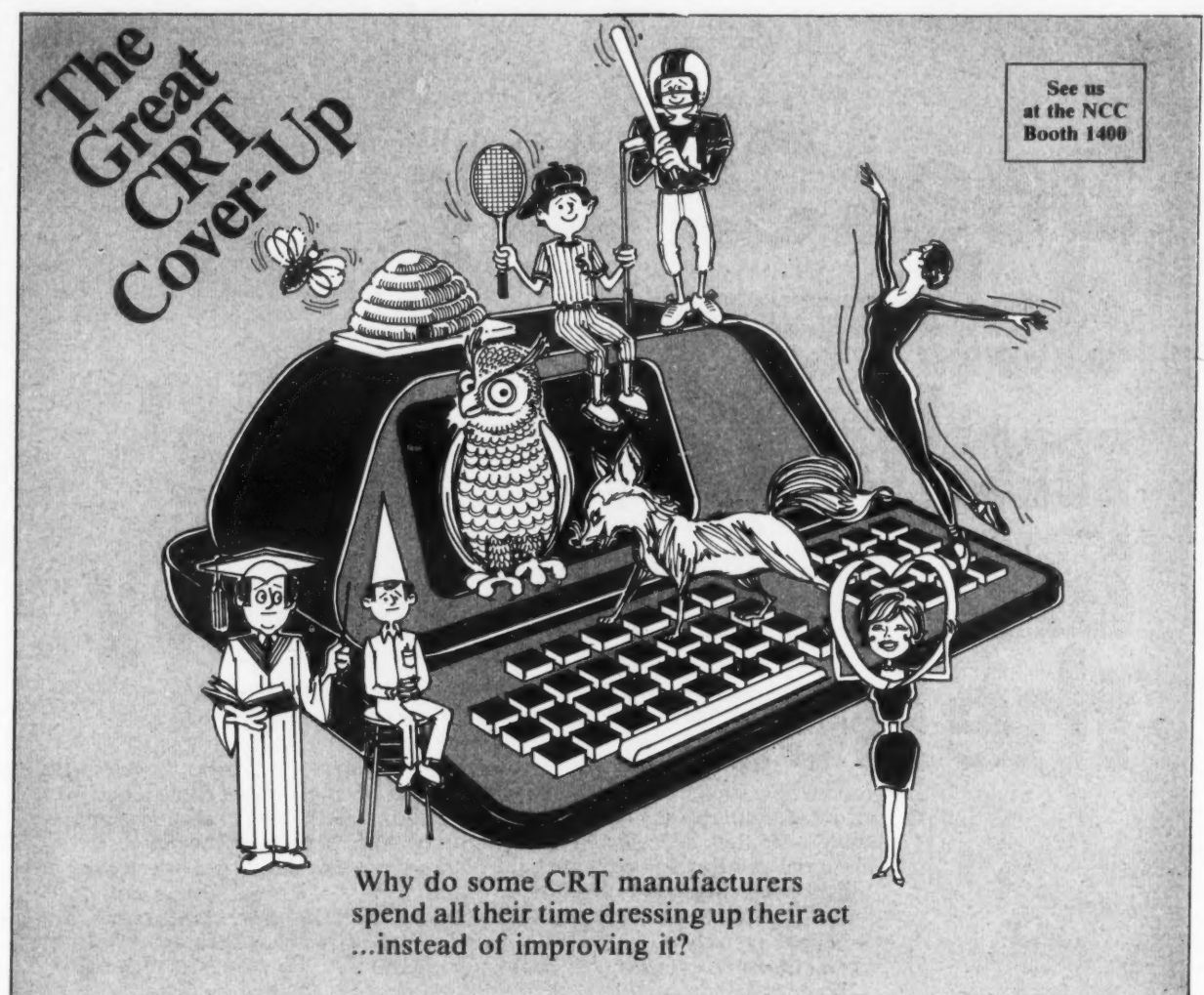
The read access time is 350 nsec and cycle time is 650 nsec. The MK 8011 offers capacities of 16K, 32K or 64K by 18 bits. It will be priced at \$4,300 for a 64K by 18 single-card system.

Mostek will also announce its LSI-11/2 add-on memory system, the MK 8005.

The MK 8005 offers capacities of 8K, 16K, 24K or 32K by 16 bits on a single memory card measuring 9 in. by 5.2 in. It also features internal distributed refresh, a battery backup provision and address DIP switch for assigning starting addresses.

Price for a 32K by 16 single card system will be \$1,690 with OEM discounts available.

Mostek is located at 1215 W. Crosby Road, Carrollton, Texas 75006.



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Minis at NCC

Prime Computer, Inc.

ANAHEIM, Calif. — Prime Computer, Inc. will be demonstrating what it claims to be the "largest minicomputer system ever shown at the National Computer Conference" — a Prime 500 with 8M bytes of main memory — in Booth 1548.

The system will be configured with 8M bytes of error-correcting MOS main memory, 600M bytes of disk

storage and will support one 600 line/min printer, one 75 in./sec tape drive and up to 16 concurrent users. The system is valued at \$1.5 million.

Demonstrating applications will be Marshall & Swift, Inc. of Los Angeles; Day & Zimmerman of Philadelphia; Marc Analysis, Inc. of Palo Alto, Calif.; Management Decision Systems, Inc. of Weston, Mass., and Imlac

Corp. of Needham, Mass.

Marshall & Swift will demonstrate an interactive real estate appraisal program. By analyzing geographical location, building structure and other variables, the program will estimate the replacement value of a building in today's market.

Day & Zimmerman, consulting engineers, will run a railroad route block-

ing program that gives the best use of track mileage for various freight transport between two points.

Marc Analysis, an engineering consulting firm, will demonstrate its Marc system, an engineering structural analysis program, as well as Mentat, an in-



Prime 500

teractive graphic software program for engineers.

Management Decision Systems will show its Express system, an interactive information analysis system used in sales and marketing analyses and modeling and for financial planning and reporting applications.

Imlac Corp. will show an interactive graphic software program developed at Rensselaer Polytechnical Institute for educational engineering applications.

Prime is located at 40 Walnut St., Wellesley Hills, Mass. 02181.

Computer Automation, Inc.

ANAHEIM, Calif. — Computer Automation, Inc. will exhibit an automated inspection station and a hardware/software office desk system in Booth 2436.

The Mica 5000 tester system features ease of use, according to the firm. It incorporates a Naked Mini 16-bit processor, 32K words of memory, integrated alphanumeric CRT display, programming keyboard, operator's console, repair message printer, 256K-byte floppy disk and system software, the company said.

The basic Mica 5000 is priced at \$29,500. Expandable to a capacity of 1,408 pins in 64-pin increments, a 128-pin system sells for \$37,900, and a 640-pin system sells for \$63,500.

CA's other offering, the Basic Desk, is configurable from a minimum single-terminal, dual-floppy disk system to a four-terminal version supporting multiple floppy and 10M-byte disks, line printer and other peripherals, the firm said.

The standard version of Basic Desk is \$11,700 in quantities of 25 and \$9,750 in quantities of 100 with 90-day delivery. CA is located at 18651 Von Karman, Irvine, Calif. 92713.

Does 35 day delivery make Centronics' line printer family the best?

NO. Centronics 6000 series band printers have much more to offer than just fast delivery; 85% parts commonality and technical features like an operator-changeable print

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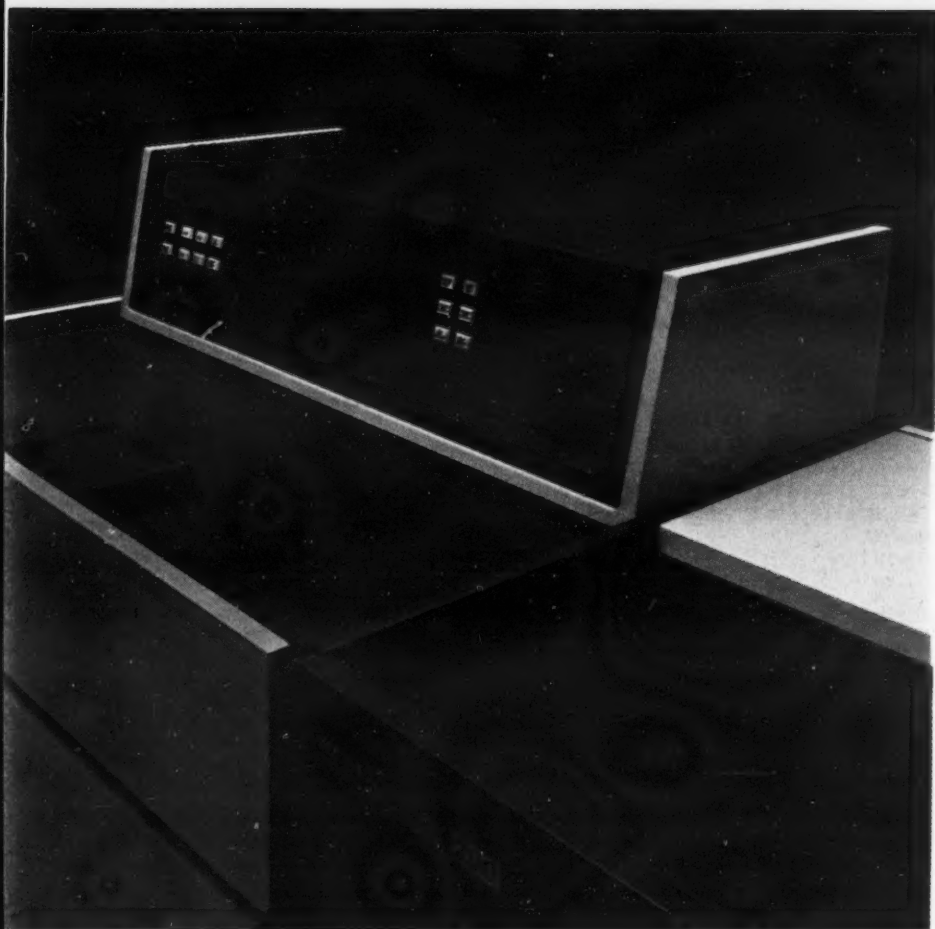
Write or call for complete 6000 series information. Centronics Data Computer Corp., Hudson, NH 03051, Tel. (603) 883-0111.



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Watch this Kodak laser printer print a 150-page report.



The Kodak laser printer prints at the rate of more than $2\frac{1}{2}$ computer pages per second.

So it can zap out a 150-page report in a shade under one minute. Or a 1000-page report in about 6 minutes.

Because it prints on microfilm—not paper—the Kodak printer condenses up to 270 bulky computer pages on a single 105 x 148-mm fiche. And it does it in under 2 minutes.

That means a Kodak printer can print a 1000-page report at a reduction ratio of 48:1 on just 4 microfiche. And each fiche is produced, titled, and indexed, ready for fast retrieval.

How does paper stack up against fiche? Using current prices,* 1000 pages of computer paper would cost \$3.50, while 4 fiche would cost just 54¢. So compared with paper, not only is printing on film demonstrably faster, it's also thousands of dollars a month cheaper.

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*Prices vary with geographic location and grade of paper purchased.

Minis at NCC

Datum, Inc.

ANAHEIM, Calif. — A family of IBM Series/1 subsystems heads the list of products to be shown by Datum, Inc. in

Booth 1647.

Users of Series/1 models 3 or 5 will be offered a storage module disk system, a high-

speed line printer system and a magnetic tape system, all to be demonstrated in their basic configurations, according to a

spokesman for the firm.

Datum 7- or 9-track Series/1 magnetic tape systems feature recording densities of 200 bit/

in. through 1,600 bit/in. PE. Speeds of 12.5 through 125 in./sec are available, and up to four magnetic tape units can be attached to each system, the firm said.

The storage module disk system provides 40M bytes to 300M bytes of removable storage. The system can reportedly accommodate from one to four disk drives in a single- or dual-processor environment.

Software Drivers

Software drivers provided for both tape and disk systems are software-compatible with IBM Series/1 operating systems.

Datum provides 300-, 600- and 900 line/min printer systems, which operate without software modifications, the firm said. The line printer controller has a self-test feature.

Datum will show its 45020 disk system with single-board design, which occupies one slot.

The 45020 is software- and media-transparent to Digital Equipment Corp.'s RK11-RK05 system, according to the firm.

The 45020 can mix or match drive capacities at speeds of 1,500 or 2,400 rev/min, the firm said.

It controls up to four 2.5M-byte, 5M-byte or 10M-byte disk drives.

Also to be shown is the TM 11 tape controller, which provides an interface between the DEC PDP-11 and any industry-standard magnetic tape drive, the firm said. All PE and NRZ densities are software-selectable. As many as four industry-standard tape drives may be connected, Datum said.

Datum, Inc. is located at 1363 S. State College Blvd., Anaheim, Calif. 92806.

Real productivity is a function of time and performance controls. The Panasonic Data Entry Terminal helps by providing simplified, immediate, error-free transmission of data by any worker, at any station, directly to the computer.

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And the Panasonic Data Entry Terminal makes source data acquisition a practicality almost anywhere. Designed for reliability, it combines a unique optical punched badge reader with advanced CMOS IC's to eliminate the need for any moving parts. The compact, lightweight enclosure is molded of high-impact material which stands up to tough industrial environments. Priced within reach, the basic unit is available with a variety of options, so you buy only the data collection capability you need.

What's more, the Terminals are designed to interface with most data processing equipment, both on-line and off-line. Frequently they will be compatible with equipment presently in use.

For added economy, any number of Panasonic Data Entry Terminals can be used on a single line without the need for an expensive multiplexer or other line controlling device.

For more information on the system that gives you tight time and cost control to improve productivity, write or call Panasonic Industrial Sales Division, 2960 Hart Drive, Franklin Park, Illinois 60131. (312) 451-1340.

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See us at NCC Booth 2616 & 2618



Minis at NCC

Tab Products Co.

ANAHEIM, Calif. — Tab Products Co. will be demonstrating two systems and several enhancements recently added to its product line, in addition to two new products currently being offered by its media storage and handling lines in Booth 1411.

Tab's Machine Products Division will be demonstrating two new systems and enhancements designed to expand the System 700 and System 501 electronic card processor. First, the Tab/Terminus Financial Control and Accounting System offers financial operations in general ledger, payroll accounts, accounts payable and accounts receivable.

The system is marketed with complete software and is implemented on a Tab Series 700 system, according to the company.

Tab will also be showing its inventory control system.

record location. The system consists of a central charge-out station and any number of remote stations, which can be placed in separate departments, the company said.

Tab's Computer Accessory Division will be showing the Model 2464 mini burster, which will handle bursting requirements in small to medium-size businesses.

The 2464 features a slide safety cover with interlock switch, variable speeds to 200 feet/min and a jam detector that automatically stops bursting activity if forms do not stack properly, according to the company.

Tab's recently redesigned multi-purpose and data media cabinets will also be shown with the following enhancements: slotted side panels in each

compartment to simplify installation of accessories that clip in to the cabinet, rollouts featuring an interlock device to ensure a single rollout, and a redesigned ganglock to ensure that the locking mechanism cannot be overridden, a spokesman for the company added.

Tab is at 2690 Hanover St., Palo Alto, Calif. 94304.



System 700

Tab's System 700 with printer option offers diskette data entry with a print-out capability in one package for monitoring inventories. This system combines the electronic filing capacity of diskettes with the ability to print forms and generate reports, according to the company.

The System 700 tape converter will also be demonstrated. This enhancement combines data entry with a tape converter in one package and is designed to permit conversion of data on flexible diskettes to reels of magnetic tape in less than three minutes, the company said. This system attaches to Tab's 701 or 702 unit and employs the data entry station's diskette drives, electronics, screen display and keyboard-to-control converter operations.

The System 700 offers an automatic pooler option that sequentially feeds up to 20 diskettes to the drive for automatic conversion to tape or transmission over a communications interface. This device loads diskettes without operator intervention until the series is complete. The load and eject pooling process takes less than 20 seconds, the company claimed.

Charge-Out System

Tab's Machine Products Division will also demonstrate its electronic charge-out system, which offers access to any

Watch the fiche fly at NCC this year.

If you want to see the latest in high-speed, high resolution COM systems, fly by booth 2408.

That's where you'll find the new CalComp Model 1680 Graphics COM System. Perched, poised and ready to go.

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CALCOMP

California Computer Products, Inc.

NCC it all at booth 2408.

Minis at NCC

Rianda Electronics, Inc.

ANAHEIM, Calif. — Rianda Electronics, Ltd. will feature its Model 25XX storage module device disk controller at Booth 4445.

The 25XX is compatible with Data General Corp. 4231 software or Media III software, staggered or sequential sectoring, the company said.

Standard features of the \$4,500 controller include automatic address veri-

fication before any read or write operation and full sector buffering, according to the company. Drive interfaces are available for Control Data Corp., California Computer Products, Inc., Ampex, Microdata and Okidata devices.

Rianda will also be displaying its Model 28XX which offers 64K-byte memory, four asynchronous commu-

nication channels, a parallel line printer interface, a real-time clock and a Teletype port in one 15- by 15-in. printed circuit board, according to the company.

When fully configured, the Model 28XX occupies one slot in a Data General Nova 3 chassis. The unit is supplied with cable set for the communication channels, teletypewriter and line printer, the company said.

Software Compatibility

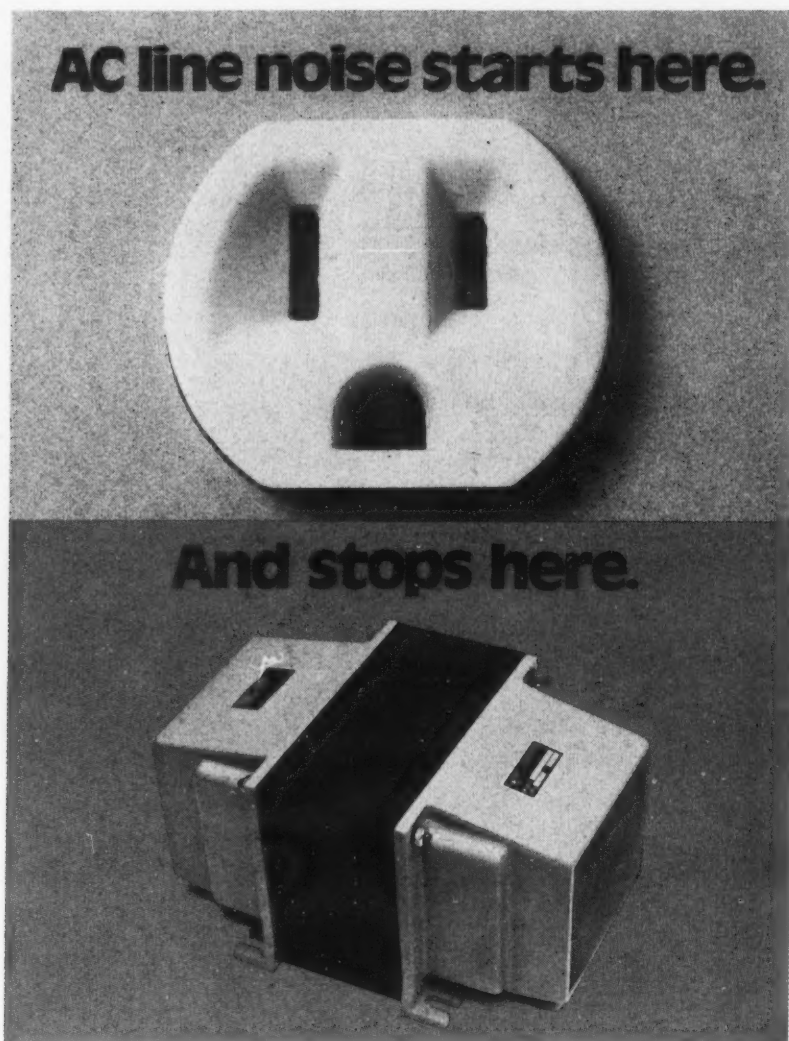
Communications channels are software-compatible with the DG 4060 asynchronous multiplexer; the line printer is software-compatible with the DG 4034/4193 printer controller; the real-time clock and teletypewriter are software-compatible with the DG 4008 and 4010, respectively, the company said.

The asynchronous multiplexer permits transmission rate selection, word length selection, parity determination and RS-232-C or 20mA I/O on a per-channel basis, the company said.

The line printer controller will interface with Dataproducts, Centronics, Printronix, Tally or equivalent line printers, according to the firm.

The price for the fully configured unit, including cable set and documen-

tation, is \$4,500. Rianda Electronics is at 2535 Via Palma, Anaheim, Calif. 92801.



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See us at NCC, Booths 1209/1211.



Dynus, Inc.

ANAHEIM, Calif. — Dynus, Inc., in Booth 3211, will display both a magnetic tape controller compatible with Digital Equipment Corp.'s LSI-11 and a moving-head disk controller for users of DEC's PDP-11 system.

The DI-CO4 tape controller plugs directly into the LSI-11 standard quad or dual wide backplane assemblies, the firm said.

The unit emulates the DEC TM-11/TU10 reel-to-reel magnetic tape system providing for software and diagnostic compatibility with existing

systems, it added.

The device uses DEC's circuit drivers and receivers and has a 128K-word address range for upward compatibility with future LSI-11s, a spokesman noted.

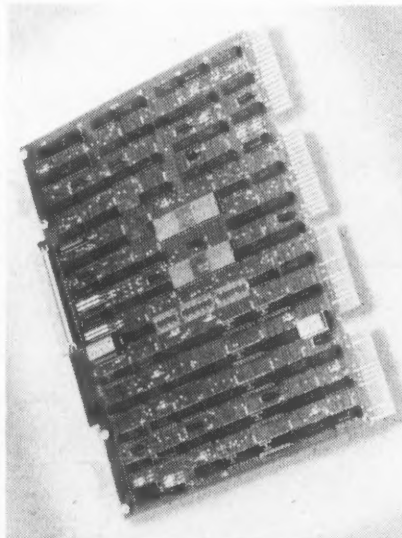
The DI-CO4 uses a bipolar microprocessor, has 2-byte on-board storage for direct memory access (DMA) latency and includes a 7- or 9-track NRZI industry standard interface. It can support up to four drives and has a data transfer rate of 33 microsec/word.

Optional equipment includes an operator control panel, integral power supply, power sequencing, line clock, card cage assembly and guides and eight quad slots wired for the Q-bus, the firm pointed out.

The DI-CO5 disk controller for the PDP-11 emulates the RK-11 disk system, providing for diagnostics and software compatibility with existing systems, the spokesman continued. Operating characteristics include an on-line storage capacity of up to 20M bytes with disk drives functioning at 1,500- to 2,400 rev/min with 100- to 200 track/in.

The units have a DMA transfer rate of 6.4 microsec/word, an overlap seek capability and record at a double frequency mode, the spokesman for the firm added.

Information on both controllers is available from Dynus, Inc. at 3198 G Airport Loop Drive, Costa Mesa, Calif. 92626.



Dynus DI-CO5

Micros at NCC

Mupro Co. Systems Division

ANAHEIM, Calif. — Two product lines from the Mupro Co. Systems Division will be showcased at Booth 4038.

The complete line of Intel Corp. Multibus-compatible memory boards will be on display. The boards are available in sizes of 4K, 8K, 12K, 16K, 32K, 48K and 64K bytes.

Boards under 16K are available with 4K dynamic random-access memory (RAM), while boards with more than 16K are available with 16K RAMs.

The 16K boards are available with both sizes of RAMs, and all boards are available in three configurations — with no error detection, with single-bit parity error detection and with double-bit error detection.

Error-correcting configurations are equipped with diagnostic indicators to pinpoint the memory chip in which any correctable error occurs, according to the company.

Features of the boards include on-board refresh on the dynamic RAM memory, provision for external refresh synchronization and battery backup capability.

Prices for the boards range from \$455 for a 4K board without error correction to \$2,750 for a 64K board with error detection and correction.

Also to be shown is an on-line program debugger for the multiuser Mupro-80DOS microprocessor development system.

Called Debug, the debugger operates in conjunction with Mupro's Multi-

user/Multi-task (Mute) Executive to increase efficiency in writing and debugging programs, the company said. Debug provides interuser protection in multiuser configurations by allowing each user to prohibit access by his program to areas outside its memory boundaries, a spokesman for the company said.

Two breakpoint capabilities are of-

fered by the system: fast breakpoints, which allow a maximum of 10 breakpoints at full program speed, and software emulation breakpoints.

The display/modification features of Debug allow the user to access any CPU register or memory location and display the contents in hexadecimal, decimal, octal, binary or disassembled source code. The user is relieved of ad-

dress calculation by relocation registers that allow automatic offsets for programs and data, according to the spokesman.

The package is said to operate on any Mupro disk system with Mute Release 2.1 for a cost of \$75 to current customers. The company is located at 424 Oakmead Parkway, Sunnyvale, Calif. 94086.

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short course
on self-control
at NCC
this year.**

Processor Technology

ANAHEIM, Calif. — Visitors at Booth 2231 will be able to view Processor Technology Corp.'s Sol System IV, which includes the company's Sol-20 mainframe with 49K 8-bit words of random-access memory (RAM), a Helios II Model 4 disk memory system, PTDOS disk operating system, Extended Disk Basic, a CRT monitor and documentation.

Total mass storage capability on four formatted disks is 1.5M bytes, the vendor said.

The PTDOS disk operating system offers functions including editors, assembler, device-independent files and random indexed files, a spokesman added.

The CRT display can be addressed randomly to any position on the screen so users can write forms control procedures.

In addition to Extended Basic, Processor Technology is offering the Disk Fortran and Disk Pilot languages as options.

The cost of a Sol System IV, fully assembled and factory tested, is \$7,995. Processor Technology is located at 7100 Johnson Industrial Drive, Pleasanton, Calif. 94566.

If you want to know where plotter controllers are headed, head for booth 2408.

We guarantee it'll be an education.

For starters, you'll see CalComp's brand-new Model 909 Controller. It's a stand-out when it comes to on-line or remote applications and goes our old Model 906 one better.

Our new top-of-the-line controller, the Model 930-100, will be busy at work, too. Demonstrating minicomputer-based "powers." It's the off-line applications "Champ" for flatbeds, drum plotters and COM products.

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CALCOMP

California Computer Products, Inc.

NCC it all at booth 2408.

OEMs at NCC

Qantex Division

ANAHEIM, Calif. — Booth 2257 will be used to show a tape transport for 3M Co.'s DC100A miniature data cartridge.

The Qantex Division of North Atlantic Industries, Inc. will exhibit its Model 200 Minidrive transport designed for OEM data storage sys-

tems. Minidrive can store up to 772,000 bytes of unformatted data on the 3M cartridge, while measuring 3- by 4- by 4-1/8-in. with the cartridge in place, the firm said.

Minidrive is available in different configurations. The simplest version provides single-track recording at 800

bit/in. data density to yield an unformatted capacity of 168,000 bytes and a 24 bit/sec data transfer rate.

A dual-track version is also available, providing 772,000 bytes on two tracks at 1,600 bit/in. density and a transfer rate of 48 bit/sec. Further, the transport can be ordered with dual gap heads, permitting read-after-write capability for data validation during recording, the firm added.

Minidrive is applicable to such "smart" analytical instruments as mass spectrometers, spectrum analyzers and blood analyzers. The module can also be built directly into process control and data acquisition systems, the firm said.

Textile Field

In the textile field, knitting machines can choreograph needle movement via data read from the Minidrive cartridge,

while looms weave patterns set by similarly taped routines, the firm said.

Minidrive was designed as the key module in a vertical array of components for OEM tape memory applications. The transport is offered as a "bare bones" unit incorporating only "intimate" electronics for firms preferring to design and manufacture their own controller, formatter, power supply and interface.

Qantex can supply the transport plus an electronics package to manufacturers who want to build a memroy into their final equipment, the firm said, adding it will help the do-it-yourself OEM customer by making available certain circuit designs and production drawings.

The firm can supply Minidrive with a direct interface to the Intel Corp. 8080 and Motorola 6800 microprocessors. The Minidrive is also said to

be upwardly compatible with the Qantex Model 650 "big cartridge" transports and electronics.

Minidrive also interfaces to the Digital Equipment Corp. PDP-11; Data General, Rolm, Interdata and Altair computers, according to the firm at 200 Terminal Drive, Plainview, N.Y. 11803.



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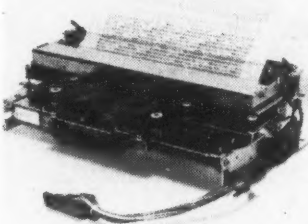
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(In New York State, call 716-847-7500.)

CW-T-5

Epson America, Inc.

ANAHEIM, Calif. — Epson America, Inc. will introduce the 80-column Model 3110 dot matrix printer mechanism featuring a 100 million-character dot head at Booth 2249.



Model 3110

The mechanism offers three times the present head life of similar mechanisms, according

to the company and sells for less than \$250 in quantities of 500.

The life of the head comes from the mechanism's alignment and pin movement, which uses techniques developed by Shinshu Seiko Co., Ltd., a spokesman for the firm added.

The Model 3110 prints 80 columns at 150 char./sec, with a 5 by 7 dot matrix character and 1/10 column spacing for small business and home computer use.

The unit requires a 24V/30-42V/5V dc power supply provided by the OEM plus case, control board and interface electronics.

The 3110 is 95mm high, 335mm wide and 185mm deep; its weight is 6.6 lbs, the firm said.

A 40-column version, the Model 512, is currently available for \$155 in quantities of 500.

Epson America is at 23844 Hawthorne Blvd., Torrance, Calif. 90505.

BASF Systems

ANAHEIM, Calif. — BASF Systems will be at Booth 1249 with several OEM disk media products, among which will

be 8-in. oxide coated disk for use in small, high-density disk drives.

A "superdisk" version for use in 3350 applications, an electrostatically plated disk with a high bit density, a two-sided version of the firm's minidisk drive and other product enhancements will also be shown by the firm.

A minifloppy disk for 5.25-in. drives and double-sided and double-density versions of the firm's 8-in. floppy disks will be included in the display.

Information and specifications concerning BASF's disk media products can be obtained from the firm at Crosby Drive, Bedford, Mass. 01730.

Precision Handling Devices

ANAHEIM, Calif. — In Booth 4016, Precision Handling Devices, Inc. will introduce a 90° tractor designed for low-profile printers.

The Model 1040-90 feeds forms along a 90° path, providing the same paper path inherent to pinwheel systems, the firm said. This feature overcomes the misregistration of multipart forms problem encountered with sprocket-fed pinwheel paper feeding

devices, according to the company.

Guide Bar Optional

For continuous guiding of stiff, multipart cardstock. (at slow speeds up to 30 in./sec), an optional guide bar is available.

Price of the product is \$1.25 each in addition to standard tractor prices. The firm is located at 63 S. Main St., Assonet, Mass. 02702.

OEMs at NCC

EMM Memory Products Division

ANAHEIM, Calif. — A 1M-byte random-access memory (RAM) module and a 128K by 22 bit semiconductor memory system will be two of the products shown by Electronic Memory & Magnetics Corp.'s (EMM) Memory Products Division in Booth 1327.

The memory module is configured with an additional 64K-byte capacity that allows for implementation of various error-checking methods while reportedly maintaining a 1M-byte capacity for data.

The module is packaged on a single pluggable printed circuit card and the unit's chassis can accommodate up to four 1M-byte modules, two I/O cards and a power supply, the firm noted.

The module operates at 2 msec in the read/restore and clear/write modes with an access time of 1.2 msec. The +5V output of the power supply also has an excess capacity to power interface I/O logic, the firm added.

The Microram 3500 semiconductor memory system has such on-card options as single-bit error correction and multiple-bit error detection and word or byte parity generation and checking, the spokesman stated. The card also utilizes page and byte coding, error stop and a fault-location LED display which operates in conjunction with the error correction/detection

feature.

The system, when operated in a page mode, will detect page boundaries; with a match condition, it can attain a cycle time of 270 nsec, the firm claimed. A no-match condition would yield a 450 nsec cycle time and non-page mode cycles are completed within 450 nsec.

The system was designed to be

plugged into the firm's Micromemory 3000 chassis or used independently, requiring only a power supply. The unit operates on 5- and 12 Vdc, but can function with 5- and 15 Vdc as an alternative, the firm explained.

EMM will also have other memory systems on display at its booth. Among them will be the Model 3800 8K by 16-bit core memory system; the

Megabyte memory card; the Micromemory 3003QD 32K RAM system; the 7711 semiconductor add-on memory; and the 32K 7501 memory.

The memory module and Micromemory 3500 are priced at .1 cent/bit and \$4,995, respectively, in OEM quantities from the company at 12621 Chadron Ave., Hawthorne, Calif. 91250.

Peripheral Dynamics, Inc.

ANAHEIM, Calif. — Three badge and card readers, designed for a variety of uses, will be exhibited in Booth 4149 by Peripheral Dynamics, Inc.

The CB3 series readers, designed for stand-alone use or mounting in a data collection terminal, accept both standard and mark sense tab cards, according to the company. Type 3 plastic badges are also accepted, and media can be intermixed, it added.

The B50 series badge readers, designed for manual operation and self-contained, will also be shown. Devices in this series can also be used stand-alone or mounted in a data collection terminal.

The series was designed to handle Type 5 badges with or without a plastic loop attached and features a latch mechanism to engage with the reference hole only when the badge is correctly oriented.

Finally, the company will demonstrate its PDI 2022 series of card readers, rated nominally at 200 card/min. Designed to fill the gap between manually fed readers and medium-speed automatic readers, the devices can read punched hole cards in 80-column format or mark sense cards in 40- or 80-column format, with or without clock track.

Peripheral Dynamics is at 1850 Gravers Road, Norristown, Pa. 19401.

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CALCOMP

California Computer Products, Inc.

NCC it all at booth 2408.

OEMs at NCC

Persci, Inc.

ANAHEIM, Calif. — A Z-80 based, double-density diskette drive controller featuring S-100 bus compatibility will be demonstrated by Persci, Inc. in Booth 1239.

Also to be demonstrated will be the company's "four-headed" flexible disk drive.

The micro-based controller, called the Model 1170, is capable of managing either single- or double-density recording on a maximum of 32 diskette sides. It has a data capacity of 16M bytes, can communicate by file name and can assume

housekeeping functions usually performed by the CPU, according to the company.

File management functions possible on the system include initialization, allocation and deallocation of diskette space, error detection and retry and creation, deletion, renaming and copying of files.

The system is also capable of diagnostic testing, a spokesman added. It was designed as an extension of the company's Model 1070 single-density controller, which means no software changes are required,

he said.

The 1170 will support up to eight of the Model 299 double-density, dual-headed, dual-diskette drives at one time, according to a spokesman, or various combinations of the company's models 299 and 277 drives. Prices start at \$800, in OEM quantities.

The Persci Model 299 disk drives will also be on exhibit. The Model 299 has a capacity of up to 3.2M bytes of data in the space required by a standard-size floppy drive and can interface with 8080, 6800,

and Z-80 systems, as well as minicomputers.

Data on the diskettes can be encoded in single or double density for compatibility with IBM soft-sectored formats or expanded hard- and soft-sectored formats on IBM diskette I, II, IID or equivalent media.

To provide the critical tolerances required by this type of drive, the company uses its own miniaturization of the type of positioner used on large disks, according to the spokesman. This results in an

average seek time of 33 msec.

Error rate is claimed to be 1 in 10^8 for soft errors and 1 in 10^{12} for hard errors, which is an industry standard.

Prices for the four-headed drive start at \$1,595 in single-unit quantities. Persci is at 12210 Nebraska Ave., W. Los Angeles, Calif. 90025.

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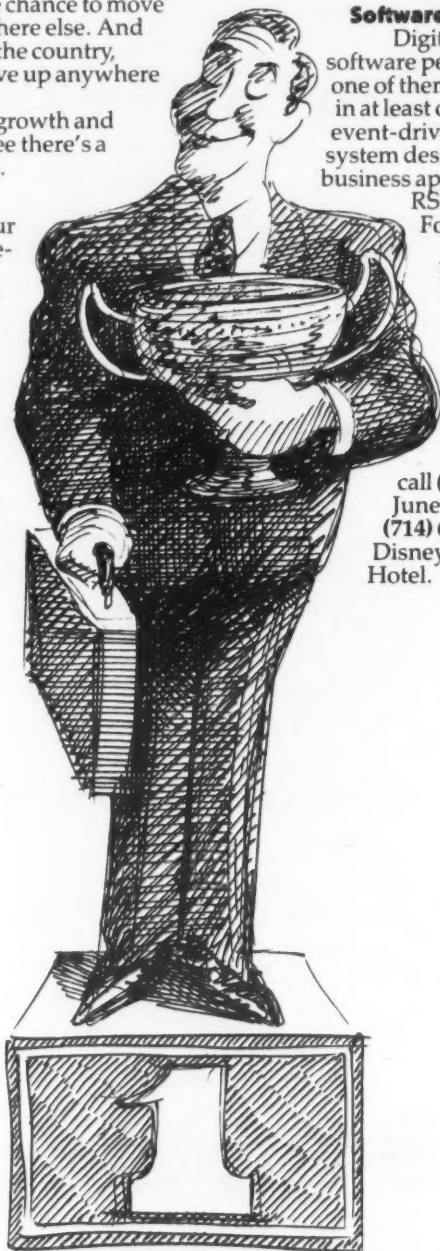
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Data Specialties

NORTHBROOK, Ill. — A rack panel-mounted punch system capable of serial or parallel interfacing, concentric spooling and quiet operation, the RP-75, will be on display at Booth 1663.

The punch, manufactured by Data Specialties, Inc., can receive at speeds up to 75 char./sec (asynchronous) or serial configuration speeds of 300-, 600- or 750 bit/sec, according to a spokesman.

The punch mechanism, which the company guarantees to punch a minimum of 1 million feet of paper tape, can also operate on Mylar, Mylar laminates and oiled or unoled tape with no modification or readjustment.

In addition, the company said the front-mounted supply and take-up spooling eliminate the need for drawer slides. Data Specialties is at 3455 Commercial, Northbrook, Ill. 60062.

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CIRCULATION DEPARTMENT

OEMs at NCC

Pertec Computer Corp.

ANAHEIM, Calif. — Pertec Computer Corp.'s Pertec Division will be showing the FD250 and the FD650 floppy disk drives in Booth 2103.

The FD650 is an 8-in. double-headed flexible disk drive capable of recording and reading data on both sides of an IBM or equivalent Diskette 2 or 2D, Pertec said.

The drive also features double-density recording to offer an addressable unformatted storage capacity of 1.6M bytes.

The two-sided diskette drive is capable of double-density operation using MFM encoding. Each drive is equipped with a door lock, and the drive has die-cast construction.

All electronics are on a single printed circuit board. Track-to-track access time is 3 msec, with head load time of 35 msec and track settling time of 15 msec. The user can daisy-chain up to eight drives.

Vertel, Inc.

ANAHEIM, Calif. — A demonstration of Vertel, Inc.'s LC-31 Gameloader Magnetic Card Reader/Encoder will take place in Booth 1856. Both the reader, which is a consumer version of the company's industrial series KB-31 reader/encoder, and the company's

The FD650 is priced at \$755 in single quantities.

The FD 250 microfloppy disk drive will also be shown. The drive stores up to 437,500 bytes without operator intervention. Double-density, hard or soft sectoring and write protect are all standard features.

The unit can write and read data on both sides of a diskette, according to

the company.

Measuring 3.25 in. in height, 5.75 in. in width and 8 in. in depth, the FD250 weighs 3.2 lbs. Its seek time is 25 msec track-to-track, with head settling time of 10 msec and head loading time of 35 msec.

Recommended recording mode is FM on single-density and MFM on double-density.

The disk drives will be manufactured and marketed on an OEM basis by Pertec Division and will be incorporated into Mits/Altair and Icom products manufactured and marketed by Pertec Computer Corp.'s Microsystems Division. Price for OEM quantities of 100 is \$325 per unit.

Pertec is located at 9600 Irondale, Chatsworth, Calif. 91311.

CalComp beats its own drums at NCC this year.

CalComp has always lead the drum plotter parade at NCC. But this year, as a visit to booth 2408 will prove, the parade is going in two directions.

First, CalComp proudly introduces the new Model 1012 Drum Plotter.

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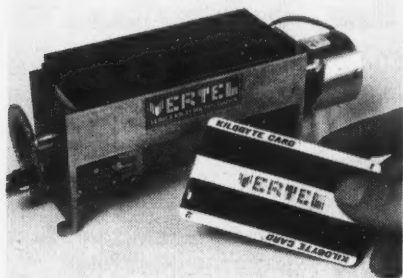
Second, leading our traditional state-of-the-art march will be the new CalComp Model 1055 Drum Plotter. Demonstrating its unmatched versatility in on-line, remote/time-sharing and off-line applications. And establishing an entirely new set of standards for high-performance drum plotters with a speed of 30 ips, an acceleration ramp of 4Gs and a 10MS pen-down time.

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NCC it all at booth 2408.



Gameloader, Kilobyte Card

Kilobyte magnetic card will be demonstrated.

The Kilobyte card is a 1K byte, 8-bit, four-stripe magnetic card designed for use in the company's readers. It will be demonstrated in conjunction with the company's latest entry in the magnetic card reader/encoder field, the LC-31.

The device is said to provide jitter-free recording and reading, with character load time of 5K byte/min.

Although functionally equivalent to the company's industrial-grade reader/encoder, according to the company, the reader was designed to meet the cost/volume requirements of the consumer market.

Features of the unit include RS-232, 20mA and byte parallel interfaces, a two-channel read and write type head, and a read/write cycle time of 5 sec/-stripe.

The device will be priced under \$40 in quantities over 100,000, the company said from 125 Ellsworth St., Clifton, N.J. 07012.

OEMs at NCC

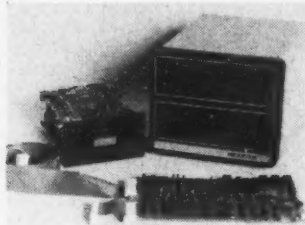
Micropolis Corp.

ANAHEIM, Calif. — Micropolis Corp. has extended the capacity of 5.25-in. floppy disk subsystems via double-sided models with formatted file storage of up to nearly 2 million bytes and will display the series in Booth 4443.

The Megafloppy series also features an intelligent controller that facilitates interconnection of four subsystems to a common host interface for a

15M bytes, according to the firm.

Micropolis Corp. is at 7959 Deering Ave., Canoga Park, Calif. 91304.



Models 1015 and 1055

total on-line storage capacity of more than 15M bytes, the firm said.

Double-sided versions of the product line will be implemented first on two OEM series — Model 1015 and Model 1055, according to a spokesman for the firm.

The Model 1015 is an unpackaged drive designed for the manufacturer who integrates floppy disk storage into his own system enclosure. A range of storage capacities from 143,000 bytes to 630,000 bytes per drive is available, he added.

Model 1015 customers have the option of using the Micropolis intelligent controller and Group Code Recording (GCR) method to further expand file space up to 946,000 bytes, the firm said.

Offering GCR and a microprocessor-based controller as standard features, the Model 1055 5.25-in. floppy has four soft-sectored formats for each of its 77 tracks, yielding a maximum capacity of 1,892,000 bytes of file space on its double-sided version, the spokesman for the company said.

Add-On Available

An add-on module available for the 1055 is comprised of two read/write heads and two drives, sharing a common controller. The subsystem capacity (formatted) with the module is 3,784,000 bytes, the firm said.

Up to four 1055s, each with an add-on module, can be daisy-chained to a common host for a maximum on-line storage capacity of more than

Accuride

ANAHEIM, Calif. — Accuride, a division of Standard Precision, Inc., is bringing to NCC several ball-bearing slide mechanisms that suspend disk drive units from cabinet enclosures and eliminate screw mountings.

This type of suspension method provides a uniform and consistent movement via linear motion mechanisms, the firm stated from 12311 S. Shoemaker Ave., Santa Fe Springs, Calif. 90670.

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OEMs at NCC

Magnusonic Devices, Inc.

ANAHEIM, Calif. — Magnusonic Devices, Inc. will roll out IBM-compatible magnetic tape and disk heads as well as several floppy disk and cartridge and cassette heads in Booth 2603. The models 3330 and

3330-11 read/write heads are available in both single- and double-density versions, a spokesman said. Both have a bit density of 4,040 bit/in. The units were designed to operate at a disk speed of 3,600 rev/min and at a tem-

perature of 60°F to 135°F.

The Model 2314, available in quadruple density as well as single and double, has a bit density of 2,200 bit/in. The 2314 was designed for configuration with disk pack, cartridge or fixed-head drives and has a head load force of 250 grams at 1,500 rev/min and 350 grams at 2,400 rev/min, the firm noted.

The Model 237-9 dual-density head assembly for read/write Ansi-compatible tapes features a ferrite erase head and a "no flux gate" design, the firm explained. The unit operates at tape speeds from 75- to 125 in./sec and has a useful life of up to 10,000 hours, the firm claimed.

The 237-9 has a bifilar winding format and an inductance uniformity of less than 15% of all the tracks within a particular block.

The 219-9 dual-density read/write head is similar to the 237-9 except that it is designed for use with 800 bit/in. tapes. It was designed for small computer systems, data terminals and key-to-tape stations and also features a ferrite erase head. Tape motion with the unit is bidirectional.

A floppy disk read/write head, also unveiled by the firm, is compatible with IBM 3741 systems and has a bit density of 3,270 bit/in. Head force load is 15 grams and the unit was designed to operate at a disk speed of 360 rev/min.

Magnusonic Devices is located at 290 Duffy Ave., Hicksville, N.Y. 11801.

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Industrial Engraving

ANAHEIM, Calif. — Industrial Engraving Co., Inc. will introduce its chemically engraved print bands for high-speed applications in Booth 3411.

Features of the bands include optimum character reproduction with no distortion and uniform band thickness in etched areas, according to the firm. The latter feature is realized through one-bite chemical etching, the firm said.

The print bands are supplied with or without surface finishing, depending on the customer's requirements.

The company is located at 2100 Liberty St., P.O. Box 311, Easton, Pa. 18042.

OEMs at NCC

Sheldon-Sodeco Printer Corp.

ANAHEIM, Calif. — Sheldon-Sodeco Printer Corp. will use Booth 2661 to display its family of print mechanisms, associated controls and power supplies for "inexpensive column printing."

Systems elements to be shown include impact printing mechanisms for 15 and 21 columns; an interface/controller based on the Mostek 3870

microprocessor; an interface/controller based on the Fairchild F8 microprocessor; a system power supply; and separate programmed 3870 chips, the firm said.

The Series PR15 and PR21 printing mechanisms can print numeric-only or alphanumeric data at speeds up to 3 line/sec for numeric models and 1.5 line/sec for alphanumeric. The PR se-

ries printers use two-color snap-in ribbon cartridges with the second color for highlighting.

Both interfaces to be shown — Model 4-621-9205 and Model 4-621-9210 — accept Ascii, RS-232C or BCD parallel data formats, the firm said. Both interfaces include the hammer solenoid drivers, read-only memory character generator, full line buffer, timing con-

trol, and logic necessary for interfacing and control.

In quantities of 100 or more, the PR15 costs \$105 and the PR21 costs \$130. The Model 4-621-9210 interface costs \$120; the Model 4-621-9205 is \$210. The 3870 chip is \$40.

The firm is located at 305 W. Grand Ave., Montvale, N.J. 07645.

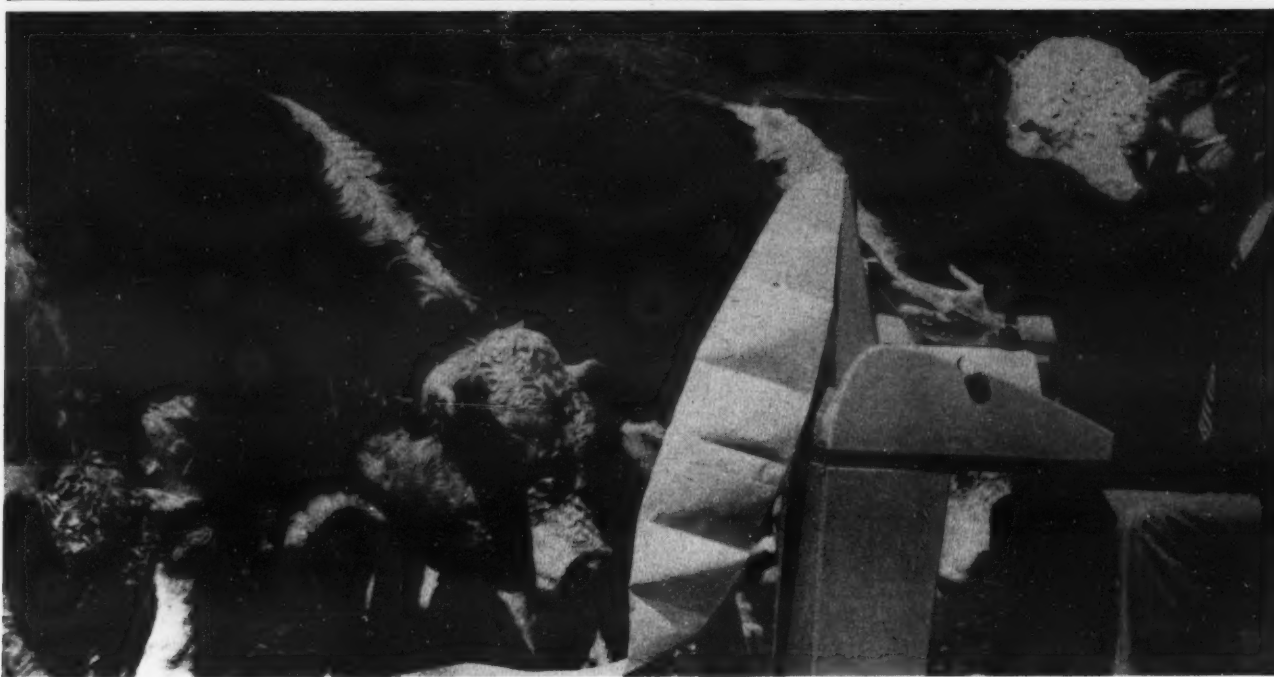


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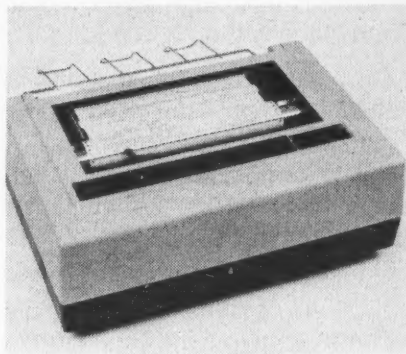
BC



Facit-Addo, Inc.

ANAHEIM, Calif. — Facit-Addo, Inc. will feature the 4540 serial page printer in Booth 2145.

The 4540 uses a print head that has hammers instead of needles or wires, according to the firm. It is based on a principle in which the print hammers are mounted on flexible arms held back by electromagnets.



Facit-Addo 4540

For each impact, the holding current is cut off and the hammer snaps forward. According to the firm, this principle has resulted in a very tight, small head guaranteed to produce 500 million characters.

Since the print force is mechanical, the effective power consumption is a fraction of that used by conventional matrix printheads, the firm claimed. As a result, it said, the head has no duty cycle limit, and there are no lubrication or adjustment problems.

Facit-Addo is located at 66 Field Point Road, Greenwich, Conn. 06830.

OEMs at NCC

Practical Automation, Inc.

ANAHEIM, Calif. — Practical Automation, Inc. will display a stepper motor paper advance option for the DMTP-6 series printers, as well as a teletypewriter emulator interface/controller in Booth 1345.

The stepper option is intended for use by OEMs whose printing requirements

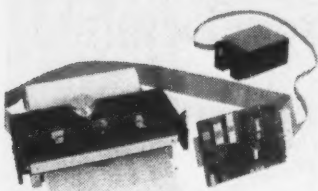
The other board function, that of a printer controller, converts these Ascii characters into printable character for-

mat and controls the motion of the print head and the order of firing the needles to create the printed character, the firm

said.

Price of the UP-9 is \$190. An 8.5-in. paper width printer with stepper motor option and

self-reversing ribbon mechanism is priced at \$425. The firm is located at Trap Falls Road, Shelton, Conn. 06484.



Printer With UP-9

demand the ability to select either 6 line/in. vertical spacing for normal text printing or 9 line/in. vertical spacing for high-density applications such as graphics, plotting or forms printing, the firm said.

Line-by-line alternation of modes is also possible, a spokesman added.

One feature of the stepper motor is the capability for forward or reverse operation at the user's discretion. This feature can be used for extra darkening or when formatting is simplified by the ability to go back to a previously printed area, the firm said.

The UP-9 interface/controller provides two functions on a 4.5-in. by 7 in. circuit board, according to the firm. As an interface, the board accepts serial Ascii data at 20mA, RS-232C or the TTL level at speeds up to 300 bit/sec.

Asynchronous Receiver

A software-implemented asynchronous receiver detects the information-carrying bits and stores them in a rotating buffer large enough to accommodate a continuous stream of 300 bit/sec data.

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OEMs at NCC

Raymond Engineering, Inc.

ANAHEIM, Calif. — In Booth 1101 Raymond Engineering, Inc. will show a version of its 6409 Mini-Raycoder that offers a bidirectional capability allowing

backspacing and bidirectional block searches.

The 6409-21 features a dual-channel read/write function that permits direct access to the entire storage media without physical handling of the data cassette, a spokesman stated. Data can be recorded in endless loop fashion by

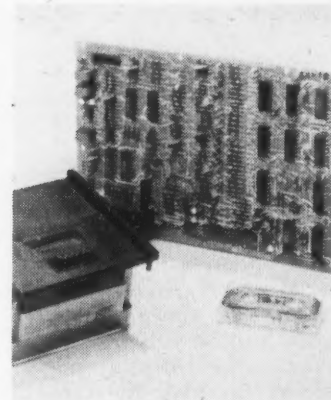
recording on one track in one direction to the end of tape, then reversing tape direction and recording on the second track.

The data transfer rate can be doubled by utilizing both data channels simultaneously, the firm added.

A number of other tape

transports will also be on display, including a microprocessor-controlled paper tape emulator with an RS-232C interface and switch-selectable data rates up to 9,600 bit/sec.

Further information can be obtained from the company located at 217 Smith St., Middletown, Conn. 06457.



Model 6409

Nortronics

ANAHEIM, Calif. — Nortronics Co., Inc. will exhibit the Magneto-resistive Head (MRH) — designed for reading encoded credit cards in Booth 1305.

The magnetic element of an MRH responds to the magnetic flux as in conventional inductive heads, but the output response of an MRH is independent of media scan, according to the company.

Possible Applications

The unit is useful for applications which require speed-independent reading of low-density information, such as card readers which rely upon hand-fed credit cards to pass the magnetic stripe over the face of the head, the company claimed.

The MRH features batch fabrication, dimensionable reproduction, track density, improved frequency response, low loss from media spacing at credit card densities, high output at conventional speeds, no speed compensating electronics and electronic decoding, the company claimed.

More information can be obtained from Nortronics, at 8101 Tenth Ave. North, Minneapolis, Minn. 55427.

Berger-Lahr

ANAHEIM, Calif. — The Berger-Lahr Corp. will be in Booth 3110 to demonstrate its line of permanent magnet stepping motors that utilize dual self-aligning sleeve bearings or optional dual ball bearings.

The RDM 36/8, 36/10, 50/8, 50/10, 50/12, 63/8, 63/10 and 63/12 each feature a bipolar or unipolar drive and can withstand temperatures ranging from -20°C to 80°C, a spokesman said. Torque ratings range from .6 oz./in. to 21 oz./in. based on motor size and step angle desired by the user.

The units are priced from \$20 to \$40 each depending on the quantity of the order. The firm is at Peterborough Road, Jaffrey, N.H. 03452.

Announcing Control Data's Multifunction Terminal, new for stand-alone and distributed processing

There are dozens of terminal manufacturers. And hundreds of models offered. But only a handful of companies offer a powerful user-programmable intelligent terminal that can operate both as a stand-alone processor and as a remote station for your IBM 360/370.

We call it a Multifunction Terminal because it can do so many things. Forms generation and entry. Accounts receivable or payable. Data entry. Inventory control. Inquiries. In a stand-alone mode or as a remote station.

We designed it to be easy to use. Our interactive forms language "coaches" non-technical personnel. And your more technically-inclined employees will appreciate the features of our advanced and business-oriented BASIC.

Extensive diagnostic programs are built into the terminal. Most are entirely automatic—a ROM-resident diagnostic executes on power-up and system-reset to check processor, memory and path to the flexible disk. Other built-in diagnostics provide more comprehensive memory and communications tests.

The final diagnostic works with an online test residing in the host processor.

Benefit from Control Data's experience

More than 15 years in remote computing. More than 13 years of experience in human-engineering and manufacturing terminals. And we design and make not only the display station, but also the floppy disk drives and matrix printer.

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Larry Eaton
General Sales Manager
Miniperipherals/Terminals Division

CD CONTROL DATA
CORPORATION

More than a computer company

Power Supplies at NCC

Computer Power Systems Corp.

ANAHEIM, Calif. — System II, a second-generation and "more sophisticated" version of the Computer Power Systems Corp.'s Model S power distribution system, will be introduced in Booth 4331.

These systems were designed to accept raw power from a building source and transform

it into a CPU's voltage requirements for distribution to the individual system's components via flexible conduit.

The System II, physically the same size as the Model S, has a solid-state System Status Panel (SSP) that provides a central location for readout information on the status of the system's power and the facility's safety systems.

The SSP monitors the status

of each power center within its control. When an abnormal condition occurs, an audible alarm alerts the operator.

Standard features of the SSP are a Digital Panel Meter that displays voltage, current and power; System Select that provides monitoring capability for up to six power centers; Main Breaker On, a lighted indicator showing whether the main breaker is on in power

centers under its control; Function Disable, an indicator showing if any monitoring function has been disabled in any power center under its control; Volt Check to indicate abnormal voltage conditions; and Over-Temp Detector to warn of transformer overheating.

Optional features include Ground Current Monitor, Faulty Ground, Building Alarm and Phase Error Monitor.

NCC attendees will also be able to view the Power Mite MKII, self-contained peripheral for the smaller computer

facility.

The Power Mite MKII was designed to accept raw power from a building source and transform it into a computer's voltage requirements for distribution to the individual system components via flexible conduit.

The unit eliminates the need for special building wiring, a spokesman noted.

The average installation time is less than three hours, Computer Power Systems Corp. said from 3398 E. 70th St., Long Beach, Calif. 90805.

Technical Overview of Control Data's Multifunction Terminal

Basic hardware comprises a keyboard display, one or two flexible disk drives and a matrix printer. Software includes an operating monitor, peripheral drivers, system job functions, system utilities, file manager, a forms language and BASIC.

Keyboard display. 2000 characters on 25 lines with 80 characters per line. Each character is generated from random-access refresh memory as a modified 7 x 9 dot matrix. Detachable keyboard.

Flexible Disk Subsystem. Consists of one or two drives that use standard single-side, double-density disks. Capacity is 0.5 Mbyte formatted storage per disk, 1.0 Mbyte total.

Matrix Printer. The optional printer accepts single or multipart paper, prints bidirectionally up to 132 characters per line at 70 lpm. Compressed print option.

Controller. A microprocessor-based controller in the display unit includes: ROM; up to 64 Kbytes of RAM; communications controller; peripheral controllers and keyboard display controller.

Forms Language. An extensive, operator-programmable forms language. Operator "coaching" appears on the CRT screen.

BASIC Language. Business-oriented, with features like: 14 digits precision; sequential, indexed and index-linked file I/O; character strings of up to 255 bytes; variable identifiers of up to 6 characters.

Communications. The terminal communicates with a host processor using Binary Synchronous (BSC) communication protocol. The system provides for auto answer and auto disconnect to allow the system to be polled while unattended. Speeds of 1200, 2000, 2400, 4800, 7200 and 9600 bits per second are supported. Protocol-compatible with the IBM 2770, 3770 or 3780. EIA RS-232-C Interface.

GD CONTROL DATA CORPORATION

More than a computer company

Boschert, Inc.

ANAHEIM, Calif. — Boschert, Inc. will introduce its 25W quad output power supply in Booth 1728.

Called the OL-25, the "switcher" features operation efficiency at 60% to 70% and little heat loss, according to the company.



Boschert OL-25

Other features include operation at 20,000 Hz, allowing the use of smaller transformers, inductors and filter capacitors, the company said. The OL-25 measures 2.5- by 4- by 6 in. and weighs about 12 oz.

The unit is "brownout-proof" because it operates over a wider input voltage range of 95- to 130 Vac than others of its type, according to Boschert. Because energy is

stored at higher voltage in input capacitors, the OS-25 is less sensitive to variations in line voltage, more immune to ac interruptions and insensitive to changes in line frequency, the company claimed.

Tentatively priced at \$80 each in 100-unit quantities, the OL-25 features four outputs terminated with a barrier strip. Standard features include printed circuit board construction, short circuit protection, overvoltage protection, input surge current protection, inherent reverse voltage protection and input EMI filtering.

The OL-25 incorporates a flyback design similar to that used in TV sets or automotive ignition systems. In this proprietary approach, only one power switch and one power rectifier are used for each output.

The OL-25 can be used with small microprocessor systems, mini CRTs, desktop calculators and almost any piece of electronic equipment requiring 25W.

Delivery will begin in July. For more information, contact Boschert at 384 Santa Trinita Ave., Sunnyvale, Calif. 94086.

Emerson Electric Co.

ANAHEIM, Calif. — Booth 2656 will be the scene of Emerson Electric Co.'s display of its line of accupower (AP) solid-state uninterruptible power supplies (UPS).

The AP series is an isolated ac voltage source and backup power source that works in case of failure to the primary power source, the company said.

The 60 Hz line consists of seven basic mechanical sizes ranging in size from 375- to 600 kVA in single module systems and up to 4,000 kVA in multimodule systems. The 415

Hz product line consists of two mechanical sizes rated 75 kVA and 200 kVA.

Components include rectifier/chargers, batteries, inverters, filters and static and electromechanical bypass synchronizing equipment.

The UPS provides simplification of logic and power blocks, high noise immunity logic and troubleshooting connections, test points and high reliability pin connectors.

Emerson Electric's Industrial Controls Division is located at 3300 S. Standard St., Santa Ana, Calif. 92702.

IPM

ANAHEIM, Calif. — A series of "front-access" uninterruptible power supplies (UPS) from International Power Machines Corp. (IPM) will be on display in Booth 2501.

IPM will exhibit the 415 Hz UPS for the IBM 3032, 3033 and 370/168, as well as a 60 Hz UPS model.

More than 800 IPM units are now in service all over the world, the firm said.

IPM is located at 3328 Executive Blvd., Mesquite, Texas 75149.



Elgar Corp.

ANAHEIM, Calif. — Elgar Corp. is slated to show two products in Booth 1209 — a power supply and a series of transformers.

The 15 kVA uninterruptible power supply (UPS) with either single- or three-phase input to single-phase output capability will be displayed. Designed for use with process control or other minicomputer applications, the Model UPS-153-1 can provide five

minutes to more than 24 hours of support during blackout conditions, Elgar claimed.

Representative models of the three-phase High Isolation Transformers (HIT) with 3 kVA to 60 kVA ratings are also planned for showing. The HITs are said to eliminate noise from power lines.

These models start at \$900, the firm said from 8225 Mercury Court, San Diego, Calif. 92111.

Clary Corp.

ANAHEIM, Calif. — Clary Corp. will be demonstrating its Mini-UPS line of Uninterruptible Power Supplies (UPS) in Booth 4009.

The four models in the series have a current rating ranging from 11A to 88A and are said to provide isolation from voltage or frequency transients from utility power.

Features of the series include convection cooling, a line-synchronizing feature which synchronizes the output of the UPS to the incoming utility power so "no break" transfer can be accomplished in the event of a power failure and a $\pm 15\%$ short-term input voltage tolerance.

Prices for the UPS range from \$1,650 for the smallest unit in the series to \$11,100 for the largest from the company at 320 W. Clary Ave., San Gabriel, Calif. 91776.

... And Other Things To See

Sycor, Inc.

ANAHEIM, Calif. — Sycor, Inc. will be demonstrating its Sycorlink networking facility at Booth 2420, along with the Sycor 405 entry-level, diskette-based system.

Sycorlink is an option which can be added to existing Sycor 445 or Sycor 405 systems, according to the company, and consists of two parts. These are a microprocessor-based hardware

controller which handles network protocol and a configurable system software module.

The microprocessor provides automatic error checking and recovery, while the software provides the services necessary to connect the data set access methods of the base node to the other network nodes.

Overall system security is provided

by the use of passwords which allow users access to the network itself; while file security is provided by using a "need to access" methodology. The actual implementation of this feature is via a file code.

Further security is provided by an optional key lock on each keyboard and software-lockable special keys at a data station keyboard, the firm said.

The advantage to using the Sycorlink network concept, according to a spokesman, is that it permits a business to configure power and resources equal to those of a small to medium-scale computer system and distribute them throughout its organization.

This means that while each Sycor unit in the network is a complete, stand-alone computing system, it can also access the files maintained by other systems, or nodes, linked to it.

Communications is possible between Sycorlink networks or between a Sycorlink network and a host mainframe with either asynchronous, binary synchronous or synchronous data link protocols.

Sycorlink is available for \$2,500 per system from the company at 100 Phoenix Drive, Ann Arbor, Mich. 48104.

Output today.... Outgrown tomorrow!

The technology of computer output equipment is changing — and fast. Where there were once only punched cards and paper, there are now a wide range of devices designed to expedite the output process. *Computerworld* will be taking a close look at these and other related topics in our June 26th Supplement entitled: *Computer Output Equipment*.

Edited by Tim Scannell, *Computer Output Equipment* will be focusing on ways to cut output costs, with tutorial and applications stories on the latest equipment and systems, including:

- Off line printers
- Interactive printer terminals
- Microfilm
- Microfiche
- High speed non-impact printers

If you want to stay up to date on the state of output, don't miss this June 26th Special Report.

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Polymorphic Systems

ANAHEIM, Calif. — Polymorphic Systems will show a line of microcomputers designed for professional and small business problem solving at Booth 1264.

Designated System 88, the series consists of a main unit, upper and lower



System 88 Version

case keyboard with control keys and a CRT monitor for updating. Other hardware features include eight-level vectored interrupts and graphics.

The main unit is based on an 8080 processor and can use one to three minifloppy disk drives.

The system includes operating software on disk plus word processor, Basic and assembler.

The software includes a file system and built-in application aids, Basic on disk that has multidimensioned strings and numeric arrays, a mat statement, a plot statement to support graphics, program chaining and variable cross-reference listing by line number.

Cost for the System 88 minus the printer starts at \$2,795. More information is available from Polymorphic Systems, 460 Ward Drive, Santa Barbara, Calif. 93111.

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... And Other Things To See

Eleven From Britain

ANAHEIM, Calif. — Eleven British companies will be at NCC in a joint venture organized by the British Overseas Trade Board in conjunction with the Business Equipment Trade Association, in Booths 1129-1139, 1228-1238, 1141-1147 and 1240-1246.

A microcomputer with priority interrupts, direct memory access, integral single or dual minifloppy disk drives and serial I/O ports operating at speeds up to 19.2k bit/sec will be demonstrated by Rair Microcomputers.

The system includes an operating system, advanced Basic interpreter and Fortran and Cobol compilers.

An interactive CRT terminal will be demonstrated by Data Recording Instrument Co., Ltd. Called Truedata, the terminal can communicate with an operator via fiber-optic pen-switched LEDs and can display numeric answers.

Sintrom Electronics Ltd. will be displaying four of its products including a continuous data logger designed for a

variety of industrial and scientific applications; a cartridge storage system for use in communications environments; a cartridge drive; and a plotter controller for use with any conventional X-Y plotter.

Lynwood Scientific Development Ltd. will show its microprocessor-based CRT units. The units can be programmed to meet customers' requirements without hardware modifications, according to the company.

A series of low-cost CRT terminals will be showcased by Newbury Laboratories Ltd. The 7000 series displays 24 lines of 80 characters each, selectable speeds from 50 bit/sec to 19.2k bit/sec and a green phosphor display.

More advanced models feature cursor controls including X-Y addressing, transmission from screen by line or page, inverse video, line insert and delete and editing of text prior to transmission.

Pocket-sized diagnostic and patching equipment, powered by two 9V batter-

ies, will be demonstrated by Modular Technology. The equipment is said to allow test of any line at any point, with audible indication of data or clock signals. The company will also exhibit a self-contained modem for asynchronous full- or half-duplex lines over dc-continuous unloaded lines.

Software will not go unheralded by the British. Management Systems and Programming Ltd. is said to have added features to its Manager series of program products.

Publications will also be represented, as *Systems International*, a monthly computer journal, will be exhibiting its publication, along with a computer with a bubble memory. IPC Electrical-Electronic Press Ltd. will be showing a product guide and will also be promoting its publication, *Computer Weekly*.

Additional information on all of these companies and products can be obtained from British Information Services at 845 Third Ave., New York, N.Y. 10022.

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EEO, ADEA, ERISA, AACP and PAYROLL headaches can be cured with a Wang Human Resource Management System, custom built for your 360/370, Honeywell, Burroughs or Univac ...

All it takes is a call to Joe Nestor (617) 851-4111, Wang Laboratories, Inc., Lowell, MA 01851.

WANG

Minicomputer Accessories

ANAHEIM, Calif. — Minicomputer Accessories Corp.'s (MAC) 1978 spring minicomputer product catalog will be displayed in Booth 1460 along with several other products.

The expanded 48-page catalog includes media, data storage devices, binders, racks and cabinets. Over 100 connectors and cables compatible with Digital Equipment Corp., Data General Corp. and Hewlett-Packard Co.

equipment will also be shown.

Among MCA's latest products are the Data Hilite Ruler, which spotlights one line of computer printout at a time, and a software engineering calculator that includes both hexadecimal and octal base arithmetic.

A free copy of the catalog may be obtained by writing MAC at Department P, 130 S. Wolfe Rd., P.O. Box 9004, Sunnyvale, Calif. 94086.

Infodetics Corp.

ANAHEIM, Calif. — The Infodetics Corp. 410 information system, available for viewing in Booth 3223, features automatic recovery and distribution of

information captured in unitized microfilm or other unit records, according to the firm.

Each 410/45 unit stores 200,000 aperture cards or tab-sized microfiche. The 410/50 unit stores 150,000 microfiche. According to the firm, multimillion document systems can be created by increasing the number of 410 file modules under the central system's control.

One module can automatically process more than 240 request transactions per hour, the company said. Information can be presented in several ways — the document itself can be brought outside the system and into the operator's hands; the image on the document can be transmitted via CRT; a duplicate of the film image can be made; or paper copies of the information can be produced either at the file or at a remote location.

The system also has provisions for single or multiple document infiling, the firm said.

Infodetics is at 1341 S. Claudina St., Anaheim, Calif. 92805.

Emergency Power Engineering

ANAHEIM, Calif. — The Computer Power Center, designed for isolation, distribution, control and monitoring of ac power to a computer system will be exhibited by Emergency-Power Engineering, Inc. (EPE).

The self-contained unit, which will be exhibited at Booth 4021, includes all components required by a user to properly interface a building's ac power source with a computer system and eliminates wall-mounted circuit breakers, according to the manufacturer.

Further information can be obtained from EPE at 2919 21 S. Halladay St., Santa Ana, Calif. 92705.

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... And Other Things To See

Quantor

ANAHEIM, Calif. — Quantor will show its Model Q118 minicomputer-controlled computer output microfilm (COM) recorder/processor and its 207D diazo microfiche duplicator in Booth 4207.

The Q118 COM recorder/processor delivers cut, dried 105mm microfiche ready for display or vesicular or diazo duplication, the firm said.

The Q118 includes a 10-M-byte random fixed head disk that provides program and parameter storage plus COM application support and standard cassettes provide disk backup, Quantor said.

The Q-Mini software package accepts a variety of print image, spool or COM-formatted tapes as input, and a conversational instructional job setup module eases setup of job parameters, the firm said.

The random-access disk is said to enable the user to support cross-reference indexing and master file update applications on fiche, capabilities that previously were available on a large host computer.

The 207D is described as a high-speed semiautomatic microfiche duplicator that has an option of being integrated with an automatic collate and stack capability.

The Q207D produces cut microfiche duplicates from a single 105mm by 148mm negative microfiche master using 4- to 7 mil diazo copy film.

The unit is equipped with a two-position carriage topped with a glass platen and a clamp which automatically grips the top edge of the master fiche. To load, the operator lays the master fiche onto the glass platen emulsion side up

and pushes the carriage in.

Duplicates are produced at a rate of 800 per hour.

The system uses a Xenon

strobe light rather than the usual mercury vapor lamp, the company said, which automatically compensates for

lamp life or power fluctuations by increasing the number of strobes per exposure.

A collate and stack operation

is also available.

Quantor is located at 520 Logue Ave., Mountain View, Calif. 94043.

When We Found Out We Were Only The No. 2 Plotter Company We Decided to Build The Smartest Off-Line Plotting System in the World. And We Did.

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- Features 4-pen-color and up to 14 inches per second in 12 or 36 inch plotters.

Get smart, call or write Zeta Research, 2300 Stanwell Drive, Concord, Ca. 94520 (415) 671-0600.



Power One

ANAHEIM, Calif. — Power One, Inc. will display a selection group of its off-the-shelf, open-frame dc power supplies in Booth 4108.

The units all undergo a full functional test, followed by a minimum two-hour burn-in and a final functional test, the firm said. They are also UL recognized.

The multiple application units, which can be custom-designed and modified to users' special needs come with a two-year warranty, the firm said.

Power One is located at Power One Drive, Camarillo, Calif. 93010.



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... And Other Things To See

Integrated Software Systems Corp.

ANAHEIM, Calif. — The use of simple commands to draw several different kinds of charts will be demonstrated by Integrated Software Systems Corp. (Issco) at Booth 2563.

The company will be demonstrating two software products this year; Disspla, a package used to generate different kinds of charts, and Tell-A-Graf, a

package used in conjunction with Disspla which provides an English-like means of issuing instructions to Disspla.

The English language commands instruct the system to draw bar, pie or curve charts and detail how to label the axes of the charts.

Tell-A-Graf enables managers, engi-

neers and scientists without an intimate knowledge of DP to produce charts or graphs suitable for presentation or publication, according to Issco.

Tell-A-Graf is priced at \$19,500 or \$18,500 for customers who are already using Disspla, according to the company at 4186 Sorrento Valley Blvd., San Diego, Calif. 92121.

International Mathematical And Statistical Libraries, Inc.

ANAHEIM, Calif. — International Mathematical & Statistical Libraries, Inc. (IMSL) will furnish information about its scientific libraries in Booth 2563. Featured will be a new library for the Digital Equipment Corp. PDP-11 series of minicomputers, according to the firm.

In addition to the PDP-11 library, IMSL has libraries for the IBM 360 and 370, Xerox 560 and Sigma, Univac 1100, Decsystem-10 and -20, Honeywell Information Systems, Inc. 600/

6000, Control Data Corp. 6000, 7000 and Cyber, Burroughs Corp. 6700 and B7700 and Data General Corp. Eclipse series of minicomputers, the firm said.

IMSL scientific libraries include over 400 subroutines written in Fortran with abilities spanning the mathematical and statistical areas, the firm said. The subroutine library can be leased for \$980/year for universities and \$1,220 for others.

Those prices include one source tape, one reference manual, one general in-

formation manual and maintenance.

IMSL's address is Sixth Floor, GNB Building, 7500 Bellaire, Houston, Texas 77036.

D.A.T.A., Inc.

ANAHEIM, Calif. — Sixteen reference books dealing with semiconductors, microprocessors and microcomputer systems will be on display in D.A.T.A., Inc.'s Booth 4434. The latest book in the series, called *The Microcomputer D.A.T.A. Book*, has reference data on 240 microcomputer systems, 210 microprocessors/microcontrollers and 1,500 related memory and I/O devices, according to the company.

Included in the 564-page book are specifications and major operating characteristics of chips, cards and systems, including a listing of instruction sets of microprocessors. In addition, logic connections for 800 products are included.

The information in the book was supplied by manufacturers, and a complete list of manufacturers is provided by the company at 45 U.S. Highway 46, Pine Brook, N.J. 07058.

Houston Instrument

ANAHEIM, Calif. — In Booth 1631 Houston Instrument will show its Microplotter 2 digital plotter, designed for the personal computing market.

The Microplotter 2 has an 8.5-in. by 11-in. page size, .005- or .01-in. resolution and an RS-232C interface.

Price of the product is \$1,085. HI is based at One Houston Sq., Austin, Texas 78753.

International Data Corp.

ANAHEIM, Calif. — International Data Corp. (IDC) will feature its new "Information Systems Planning Service" program in Booth 1471.

IDC's existing programs include computer installation data files, continuous information services for vendors and financial institutions, executive DP conferences, custom research and seven market-oriented newsletters covering the DP industry.

IDC is located at 214 Third Ave., Waltham, Mass. 02154.

Van San Corp.

ANAHEIM, Calif. — Peace and quiet will be featured in Booth 2369, where the Van San Corp. will be demonstrating its Quietizer Cabinet 1720 series.

The Quietizer, which is available for the 80- and 132-column Model 40, tractor or friction-feed machines, is said to feed and restack a full box of paper and provide its own filtered air wiring, the firm said from 1180 Centre Drive, City of Industry, Calif. 91748.

The MVT/X3.
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... And Other Things To See

3M Co.

ANAHEIM, Calif. — A rigid floor mat that drains static charge from office personnel who work around data and word processing equipment will be exhibited in Booth 2257.

The 3M Co. will show its Velostat 1850 series electrically conductive floor mats designed for anywhere electronic hardware is used. The mats form "islands of protection" around computers and electronic office equip-

ment, preventing static-caused loss of data and alteration of memory, the firm said.

Castered chairs can be rolled over any of the mats — even if laid on thick carpeting — and the conductivity is unaffected by age and room humidity.

The mats come in three sizes. Type 1852 measures 32 ft. by 24 ft by 1/8 in. It was designed for components

usually operated from single standing positions, such as electronic cash registers.

Type 1853 measures 5 ft by 4 ft by 1/8 in., including a 30- by 10-in. lip, and was designed for personnel sitting on casted chairs — word processor operators, for example.

Type 1854 measures 8 ft by 4 ft by 1/8 in. It is said to protect a cluster of

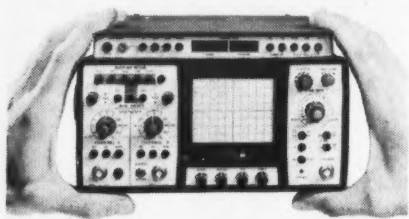
equipment — for example, a CPU configuration.

All mats come with a 10-ft ground cord having a 1M ohm resistor, the firm said. Types 1852, 1853 and 1854 cost \$30, \$95 and \$105, respectively.

Further information is available from 3M Co., Department SC7-10, P.O. Box 33600, 3M Center, St. Paul, Minn. 55133.

Vu-Data

ANAHEIM, Calif. — Booth 2557 will spotlight the Vu-Data Corp. Model PS935/975 DMM-Counter-Mini-scope, the dual-trace follow-on to the single-trace Model PS915/975 introduced in November 1975.



Model 975

The latest instrument has increased bandwidth to 35 MHz from 20 MHz; vertical sensitivity has been doubled from 10mV/div to 5mV/div; sweep resolution has been increased from 20 nsec/div to 10 nsec/div; and the scope trigger range extends to 50 MHz instead of to 20 MHz. The counter frequency range has been extended from 20 MHz to 50MHz.

There is also an increase in CRT acceleration voltage from 2 kV to 5kV, resulting in greater brightness, and an increase in the CRT display area, Vu-Data said.

The Model PS935 may be purchased separately or in combination with the Model 975 DMM-Counter. The Model 975 includes a 3-1/2-digit, autoranging digital multimeter as well as a four-digit, 50 MHz frequency counter.

The Model PS935 without the Model 975 sells for \$1,495, while its price totals out at \$1,895 with the DMM-Counter.

Vu-Data is located at 7170 Convoy Court, San Diego, Calif. 92122.

Knickerbocker

ANAHEIM, Calif. — The Knickerbocker Case Co. will show its line of computer service people's tool cases, including printed circuit board cases, in Booth 1657.

The firm is located at 2037 N. Campbell Ave., Chicago, Ill. 60647.

New Info-guard™ Encryptors



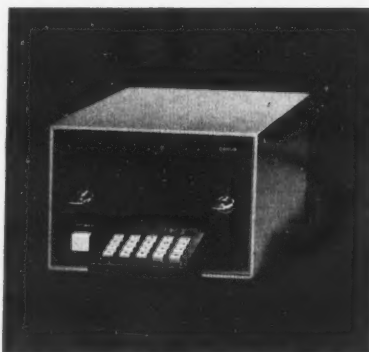
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For more information, call James Booth 602/949-4735 or write him

at Motorola's Government Electronics Division, Dept. L-2, P.O. Box 2606, Scottsdale, AZ 85252.



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At Army Management Center Logistics Course Includes Micro Theory

By Tim Scannell
CW Staff

PETERSBURG, Va. — Army training programs are generally thought of as being limited to such areas as weapons technology, bivouacking procedures and double-time marches. One particular class here at Fort Lee, however, is using microprocessor theory as a basis for training mid-level officers and civilian managers on all aspects of the Army's computerized supply system.

The primary function of the instructors at the Army Logistics Management Center is to illustrate in detail an object or piece of equipment "from the beginning to the end of that item's life cycle," according to David L. Johnson, a logistics management specialist at the center. The program includes courses in research and development, testing and evaluation, procurement, storage and eventual disposal.

Microcomputer technology is used to demonstrate the DP angle of material supply, because many of the several thousand people who attend the seminars each year haven't any idea just how a computer works, Johnson said. "The managers that come here are often familiar only with the big IBM-type systems and the majority of them have never really 'seen' their DP facilities," he said.

The logistics center tries to bring things into perspective for them in today's world, Johnson stated. "We would like to present a microcomputer on a rolling table, fire it up before their eyes and play some business-oriented games and scientific calculations." The whole idea is to graphically convey to these managers just where microprocessors are taking us and to show them that computers are not necessarily huge machines, Johnson explained.

Although the center doesn't have a microcomputer permanently installed, it does have an Imsai Manufacturing Corp. 8080 system that is currently in a developmental stage. The system, including 32K of random-access memory (RAM); a multiple I/O board; a dual-floppy disk drive and a Texas Instruments, Inc. Silent 700 terminal, was purchased more than a year ago, Johnson said. "Unfortunately, we lost two people during the year who were going to do some developmental work on it, so we're kind of at a standstill." The system has been used for some business simulations, Johnson stated, "but that is really all we've done with it so far."

The instructions are presently limited to chalkboard diagrams and pictures. "We feel the course will be a lot more effective if the students can take the top off the system, look at the boards and say, 'Oh yeah, that's a memory chip' and things like that," Johnson said.

Johnson's interest in microcomputers doesn't stop with his job. At home, he has a Polymorphic Systems, Inc. Poly-88 microcomputer that he built from a kit in his spare time. "Specifically, I got the system for the purpose of familiarizing my children, ages five and nine, with computers," Johnson continued. "But, as everyone does, I guess I play a lot of games with it myself." The Poly-88 has also been used to develop business programs used at the center, Johnson said, and to demonstrate microprocessors at a couple of grade schools.

Johnson, who describes himself as not being "a stranger to electronics," estimated that it took him a total of 60 hours to assemble the Poly-88 system.

Some Shortcomings

The Imsai system scheduled for implementation at the center, although excellent from a design and performance standpoint, falls short on documentation and software, according to Johnson. "The software, in particular the Basic Interpreter, in my opinion is not as useful and doesn't have the features

offered by some of the other microcomputer interpreters. For example, formatted print statements are very important to what we do" and the Imsai simply doesn't provide for this function. "We have, however, ordered a copy of C-Basic, which is a commercial Basic, and I understand it does have the various features we need," he said.

"The documentation really isn't very good at all," Johnson remarked. The material "just doesn't explain things well enough; there are too many holes in it and the user has to do too much digging on his own to figure out what's going on," he said.

Comparing his system at home with the Imsai 8080, Johnson commented that each of the two microcomputers is satisfactory for certain types of users and applications. "For someone with limited funds, the Poly-88 is vastly superior. But if a person can invest \$5,000 or \$6,000, then there's no question the Imsai is a very fine system."

However, "the Poly-88 is up and running, it's been very reliable and it does almost everything I want it to do" for a moderate investment, Johnson added.

Junior High Student Captures Prize for Income Tax Program

FORT WORTH, Texas — Prizes and ribbons are seldom, if ever, given to people for completion of their tax reports. However, an eighth-grader here did win an award for writing a program designed to guide a person, step-by-step, through the 1040-A personal income tax form.

Ralph Lipe, 14, received the award at a recent intramural science fair held at the McLean Middle School. His project captured the first-place ribbon in the "math and computers" category and was chosen "Best of Fair" out of approximately 200 entries.

Subsequently, at the Fort Worth Regional Science Fair, which hosted 460 entries from 17 countries in northern Texas, Lipe won a first-place ribbon in the "math and computers" category and a first-place ribbon from the Institute of Electrical and Electronics Engineers (IEEE). He also placed "Third Best of Show" in the Junior High School Division, the spokesman stated.

It reportedly took Lipe 60 hours to write and debug the program. The idea for writing it came from his mother, Jane Lipe, a certified public accountant, who assisted him in setting up some of the equations for the tax questions. Ralph then converted the information to Basic language to program a Radio Shack TRS-80 microcomputer.

When Ralph first saw the microcomputer,



Fourteen-year-old Ralph Lipe took top honors at recent science fair in Texas for his 1040-A tax form program.

he knew almost nothing about making it operate, according to his father, Gary Lipe. "The computer attracted him like a magnet," the father said. "Before I knew it, he'd weaseled his way between me and the microcomputer and was trying to program it himself."

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Single Board With Basic Dynabyte Builds Control System

PALO ALTO, Calif. — Dynabyte, Inc. has designed a single-board programmable microcomputer system for control applications ranging from operating a model railroad train to managing a building's electrical system.

The Basic Controller allows the user to operate the computer and the external devices it controls with the firm's Basic control language, Zibl, according to a spokesman. The control functions are divided into six categories: sense inputs, flag outputs, lights, (user definable LEDs),

relays, analog-to-digital and digital-to-analog.

File structures allow multiple programs written in Zibl to reside concurrently in the random-access memory (RAM), the firm said. Each program can be individually loaded, renamed or run.

A program can access other programs as subroutines while still retaining its own line numbers and variables, the spokesman noted.

Listing, printing and inputting can be accomplished from any serial or parallel I/O channel or the controller's

self-contained CRT I/O, Dynabyte said. Interaction with the controller is through the user's keyboard and CRT monitor, which interfaces to the printed circuit board.

The Basic Controller costs \$750 for a system including a Z-80 MPU; 32 flags; 32 sense inputs; eight relays; eight lights; two serial, one parallel I/O, a cassette I/O, a video I/O and keyboard ports; two 2716 sockets with programming capability; 4K of on-board RAM.

Dynabyte is at 4020 Fabian, Palo Alto, Calif. 94303

Language Instruction Offered

HOUSTON — A series of foreign language educational programs for "any microcomputer system" that offers instruction, testing and practice of French, Spanish, Italian and German has been announced by Musgrove Engineering.

Programs in the Foreign Language Vocabulary include separate modes for practice drills that are selectable by the user at any time during program operation, according to a spokesman.

The instruction mode displays the randomly selected word in both languages; the

practice mode displays the word in one language and permits several user guesses before printing the correct answer; and the testing mode permits the user to select the number of words to be tested and returns the test score upon completion.

An Educator option is also available that permits the creation of files for the storage of student identification, test responses and test scores, for use in a classroom situation, the spokesman added.

Each volume of the Foreign Language Vocabulary, written in Basic, includes an annotated

program listing and program flow chart to facilitate user loading and understanding the spokesman said.

The programs utilize single-statement lines to avoid confusion and permit ease of user modification, the firm claimed.

Each language program costs \$5 with the Educator option priced at an additional \$3. All four volumes cost \$17.50 or \$27.50 with the special option.

Quantity discounts are also available, Musgrove said from 9547 Kindletree Drive, Houston, Texas 77060.

Computerfest '78 Set For Detroit June 23-25

DETROIT — Computerfest '78, a three-day exposition sponsored by the Midwest Affiliation of Computer Clubs (Macc), will take place June 23-25 here at the Detroit Plaza Hotel.

The conference will primarily be geared toward personal computing, but emphasis will also be placed on microcomputer applications in small business, user education and the future social impact of microprocessor technology, a spokesman noted.

Seminars and technical sessions will cover business systems, graphics and art, applications for the handicapped, automotive applications and hobbyist projects.

A flea market and exhibits by various computer clubs and organizations are also planned.

The registration fee for the three-day exhibition is \$5; it is \$4 if registration applications are received before June 15. Information and tickets can be obtained from Semco/-Computerfest '78, Box 9578, Department Mike, Detroit, Mich. 48202.

16-Bit Module Announced by TI

DALLAS — A microcomputer module from Texas Instruments, Inc. offers up to 4K words by 16 bits of electrically programmable read-only memory (Eeprom) and up to 2K words by 16 bits of static random-access memory (RAM).

The TM990/101M, an extension of TI's 990 series, also contains two serial I/O ports, one for "remote" usage with a terminal or modem, the other for "local" usage with the firm's 301 Microterminal, an EIA standard terminal or a teletypewriter, TI said.

The module is available in three versions, each differing in the type of local port I/O signal and in the amount of programming of the Eeprom memory. One model, for instance, is configured for tele-

typewriters and contains 1K of Eeprom and 1K of RAM with the firm's Tibug monitor program located in the Eeprom, the firm stated.

All three versions, however, offer three programmable interval timers, up to 17 interrupts and 16 lines of programmable parallel I/O, the company added.

Optional accessories for the module include an I/O board, memory expansion boards, a prototyping board, a four-slot OEM chassis, connector kits and cables to interface to selected terminals.

Assembled and tested, the module with 1K by 16 bits of Eeprom and 1K by 16 bits of static RAM costs \$625. TI can be reached at P.O. Box 1443, M/S 653, Houston, Texas 77001.

Spectronics Designs Lamp To Erase Eeprom Chips

WESTBURY, N.Y. — The Spectronics Corp. has an erasable programmable read-only memory (Eeprom)-erasing ultraviolet lamp that will erase up to nine chips in as few as 12 minutes, the firm said.

The unit's two high-intensity ultraviolet lamps are fully shielded. The Spectroline PE-24T has a safety interlock to prevent the unit from operating when the tray is not

fully inserted.

A conductive foam pad holds the chips in place during exposure and reportedly prevents electrostatic buildup while protecting the chips from possible static charge.

A 60-minute timer is included for automatic shut-off.

The PE-24T sells for \$104.50 from the firm at 956 Brush Hollow Road, P.O. Box 483, Westbury, N.Y. 11590.

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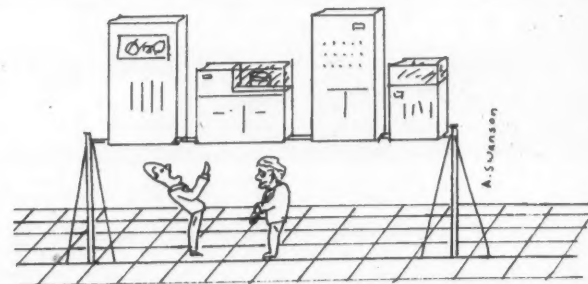
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'Smathers, That's Not What I Meant by Putting the System On-Line.'

In New Jersey, California Software Tax Opponents Make Progress

By Marguerite Zientara
CW Staff

Further progress has been made in the states of New Jersey and California in the software industry's attempts to ensure the nontaxability of software.

In New Jersey, most of the software industry has been exempted from sales and use tax, effective May 4; in California, a meeting between the Department of Taxation's Board of Equalization and software experts will take place within two weeks to review and possibly redraft State Regulation 1502, which dictates the taxation of software and services.

The New Jersey action resulted from the adoption by the director of the state's tax division of a tax regulation that interprets the law stating that tangible personal property is taxable, according to a spokesman for the Tax Counselor Division of the State Division of Taxation [CW, April 24].

DP Products In Data Base

LEXINGTON, Mass. — GML Corp. here recently introduced its Computer Equipment and Systems Data Base, which it said contains about 750,000 pieces of information covering 12 product areas.

The data base's information is compiled by personal contacts between GML and manufacturers. The base currently contains data on 800 computers, 750 terminals, 1,500 disks and 1,200 printers being manufactured.

Questions from various perspectives including marketing, sales, and purchasing/selection can be addressed to the base.

Available on a subscription basis, on magnetic tape or in report form, the file is continually updated, GML said from 594 Marrett Road, Lexington, Mass. 02173.

The regulation, published April 6 in the *New Jersey Law Journal* and the state government's *New Jersey Register*, exempts most software and services from taxation except for data conversion services such as keypunching, where the product is delivered directly to the customer.

In exempting software from taxation, New Jersey is requiring that the programs either be modified to run in the environment of the customer's particular make and model of computer or be the

result of analysis by the vendor of the customer's requirements. This position is similar to that taken by the State of New York [CW, Nov. 21].

"This is an eminently fair decision which is in line with what New York State has done. It will prevent people from switching from one state to another in an effort to avoid what was an inequitable tax," according to Sanford Goldberg, an attorney with Roberts & Holland of New York and tax counsel in the case for

the Association of Data Processing Service Organizations (Adapso).

Adapso intends to continue working to further refine New Jersey's rules, particularly in the area of data conversion services, according to a spokesman.

The agreement on the California meeting was the result of a two-hour public hearing May 4 at which members of California's Sales Tax Action Group (Stag) testified against the Regulation 1502, which taxes software and services [CW, April 24].

"The hearing went very well; we got just what we wanted," Stag President Donald Mulvey said.

Stag is an unincorporated association of representatives from approximately 150 DP companies based in California or with business activities in California. The group feels the board improperly taxes intangible computer programs through "contrived logic" and is inconsistent in its application of the regulation's provisions, resulting in "selective, discriminatory and inequitable" taxation.

Don't Bank Just on EFT, Report Warns Vendors

By Marcia Blumenthal
CW Staff

SAN JOSE, Calif. — While electronic funds transfer (EFT) applications will outpace all others in the banking industry, vendors should not bank solely on EFT to the exclusion of developing other new products and traditional applications, a report released recently by SBS Publishing cautioned.

EFT will account for 19% of DP expenditures in the industry by 1985, up from a 1977 share of 6%, the report noted.

The banking industry has been the second largest commercial DP market for two decades, accounting for \$4.9 billion in 1977 — slightly less than 11% of total U.S. DP expenditures, the report noted.

By 1985, the industry will spend \$12 billion annually, about 10% of the projected U.S. DP market of \$112.7 billion, according to "Banking DP Product and Service Opportunities — The Reality Ahead For EFT."

Although this 10% growth rate will be slightly slower than the average DP growth of 12% in all industries, the study noted that banking was one of the first in-

dustries to adopt DP for business operations. The smaller growth rate therefore represents a maturing, not a major slowdown, of DP expenditures in banking, the study concluded.

However, certain product and application segments within the banking industry will grow faster than the forecast 10%. In the

(Continued on Page 59)

Study Sees Micro Systems Capturing Business World

CHERRY HILL, N.J. — Outfitted with business-oriented peripherals and application programs, the personal computer will have a more significant impact than any of the mini-computer-based business computers introduced to date, according to a report recently published in "Small Business Computer News," a publication of Management Information Corp.

Until recently, the business with annual sales of less than \$2 million had three DP alternatives: to use a service bureau; to select a small business computer

system; or to assume a wait-and-see attitude.

The micro-based personal computer now offers a fourth alternative, the report said. However, limited storage capacity and the scarcity of application programs are two pitfalls of using the personal computer for business purposes, it added.

The market for personal computers will soar from present annual sales of about \$60 million to more than \$300 million by 1980, representing a jump from 15,000 systems sold in 1976 to more than 100,000 in 1980, the report projected.

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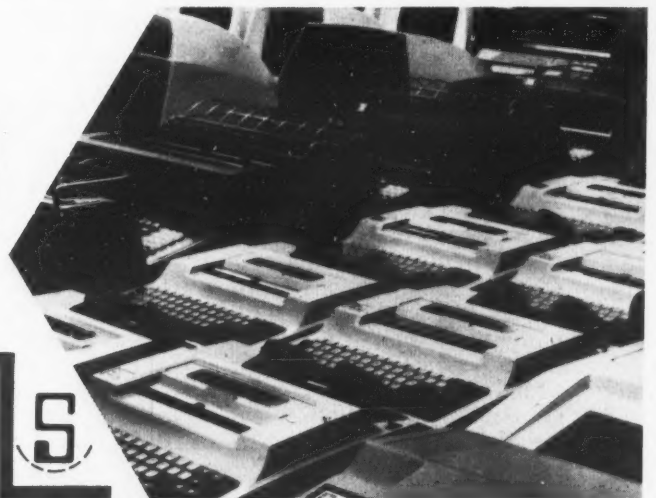
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Milacron to Sell Its Small Systems Business

By Jeffry Beeler
CW Staff

LEBANON, Ohio — Cincinnati Milacron, Inc. has entered into an agreement of intent to sell its small systems business to the employees of its computer products group, company officials announced recently.

The proposed divestment, which is slated to take effect in June, marks Milacron's departure from the stand-alone systems field, although the firm will continue to supply minicomputers as modules for its numerical control product line.

Under the divestment plan, Milacron's computer products group would reportedly become CSD International Corp. an independent company with worldwide manufacturing

and marketing rights to the parent firm's George line of small business systems. The plan also calls for Wayne Sennett to leave his post as manager of Milacron's computer division and join the outfit as president.

Milacron's sale of its computer operation stemmed partly from the firm's growing belief that involvement in the small systems business conflicted with its long-range corporate goals, Sennett explained.

Since it entered the computer industry in the early 1970s, Milacron had devoted an increasingly large share of its resources and R&D expenditures to the small business systems field. But in recent years that share had grown so large that it threatened to distract the firm from its primary mission — the

machine tool and numerical control equipment business, he said.

Sennett also attributed the divestment to physical expansion in the Milacron computer division, which he said had outgrown its existing manufacturing site and had long been searching for an alternative facility.

He dismissed the suggestion, however, that the firm's decision to quit the small systems business was prompted by falling profits. Although he declined to reveal the Milacron computer operation's most recent earnings, Sennett stressed that when those figures do become available "people will find them very favorable."

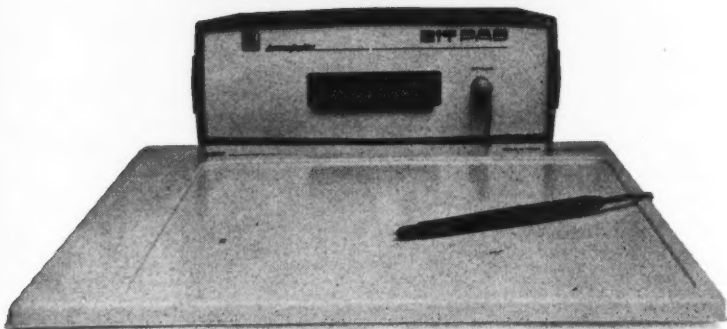
In becoming an independent entity, CSD International acquired all the former Milacron division's fixed assets and inventory as well as its nationwide

network of sales and service offices, Sennett said. As a separate firm, therefore, CSD International would be able to provide the same level of support and maintenance for the George product line as the parent company, he assured users.

CSD International also inherited the Milacron operation's product development plans, which call for the introduction of assorted offerings including additional minis, compilers and operating systems during the coming months, he added. Sennett and his management staff members, almost all of whom are holdovers from the Milacron division, intend to begin implementing those development plans soon after the infant company occupies its new headquarters and manufacturing facility, which will open near here in July.

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CI Notes

Garcia Named to Head NCR's U.S. DP Group

DAYTON, Ohio — NCR Corp. recently named Manuel Garcia senior vice-president for the U.S. Data Processing Group. In this capacity, Garcia will supervise the sales, service and support of NCR computers, data terminals and other DP equipment.

The U.S. Data Processing Group consists of 14 regions and has about 400 district offices located in all principal cities.

Filling a vacancy created by the retirement of E.F. Shipman, Garcia joined the company in 1977 as vice-president assigned to special marketing projects.

IBM Announces Changes In Executive Lineup

ARMONK, N.Y. — IBM recently announced three executive position changes.

William W. Eggleston, formerly president of the IBM World Trade Americas/Far East Corp., is the new assistant group executive of the Data Processing Product Group.

Eggleston's former post was taken over by Terry R. Lautenbach, who had been president of the Data Processing Division (DPD).

The new DPD president is C. Michael Armstrong, previously DPD vice-president, marketing operations.

Signetics to Second-Source Intel 8021 Single-Chip Micro

SUNNYVALE, Calif. — Signetics, Inc. and its parent, N.V. Philips' Gloeilampenfabrieken, announced they will second-source the Intel Corp. 8021 general-purpose single-chip microcomputer, a new lower cost version of Intel's 8048.

A company spokesman said. "It was important to commit ourselves early to this chip because it offers the features single-chip users are looking for at the lowest price of any single-chip 8-bit microcomputer presently on the market."

Intel will provide Signetics with the 8021 mask set, test programs, schematics and engineering support, which will ensure early full compatibility of the Signetics and Intel 8021 products, which Signetics expects to sample during the fourth quarter of 1978, the company noted.

Supershorts

An exhibition of business equipment, computers and health care equipment, considered the most promising sectors for U.S. export to New Zealand, will be sponsored by the U.S. Department of Commerce in Wellington, New Zealand, on July 24-28.

The New Zealand computer and business equipment market, currently over \$60 million (installed), is expected to almost double by 1981, with the best opportunities for mini- and microcomputing systems.

Connecticut Business Computers, Inc. recently became the exclusive distributor of Qantel Corp. computer systems for Connecticut (with the exception of Fairfield County).

Hewlett-Packard Co. delivered its

1,000th HP 1000 series computer system to the Products Research Division of Exxon Research and Engineering Co.

Pertec Computer Corp. (PCC) announced that the Triumph-Adler Group, a subsidiary of Litton Industries, Inc., is the PCC licensee in West Germany, Austria and Switzerland.

Also, a similar agreement was recently reached with Sociedad Espanola de Comunicaciones e Informatica S.A. in Spain.

Storage Technology Corp. received a President's "E" Award in recognition of its export activity growing more than 900% over the past five years, from \$3 million in 1973 to \$27.5 million in 1977.

Don't Bank Only on EFT: Study

(Continued from Page 57) product area, terminals supporting on-line systems, including EFT, will account for more than 14% of total DP expenditures in 1984 vs. 10% in 1977.

In addition, the use of mini-computers will increase for both traditional banking applications, such as mortgage loan portfolio management, and for distributed data processing applications, including remote check processing.

EFT Growth

While demand deposit accounting applications will continue to dominate DP ap-

plications, the study forecast that EFT growth, despite its current lull, will outpace all other applications, accounting for 19% of DP expenditures by 1985, up from 6% in 1977.

Charge card processing will be the most widely used EFT application, growing 24% annually and reaching a hefty \$940 million by 1985, compared with \$172 million in 1977.

Telephone Payment

Telephone payment systems, the study projected, will be the new product within the applications sector.

However, the study cau-

tioned vendors not to neglect the development of new products and services for traditional applications in favor of EFT. The per-transaction cost of EFT is presently quite high and will not fall below the cost of manual methods until consumer resistance is overcome, the report said.

Other important application areas noted in the report included mortgage loan and savings accounting and resale services, such as payroll and trust accounting, which larger banks offer to smaller banks and retail customers.

Aside from product and application trends, the report predicted all banks will begin to look alike to the consumer as banking systems vie to offer customers expanded services.

The banking industry consists of four segments: commercial banks, savings institutions, credit unions and commercial finance companies.

Although the study forecast all banking segments will expand services, it said the emphasis within the segments will be different.

Inside Automation

For instance, commercial banks will spend more to automate inside services — including central information files, on-line account balance inquiries and transaction processing at teller stations — than they will on automated teller machines, point-of-sale terminals and telephone payment systems.

On the other hand, credit unions and savings banks, which are already highly automated, will concentrate on EFT in order to broaden services and appeal to a wider range of customers. Credit unions were predicted to be the major EFT innovator in the commercial sector.

While savings banks and credit unions do not have the wholesale and retail contacts of a commercial bank, the study pointed out, these thrift institutions do have the flexibility and on-line systems already in place, which commercial banks lack because of their large investment in batch-oriented systems.

A Few Clouds

Although the future for DP in banking will continue to be rosy, the study painted the horizon a bit cloudy for vendors competing for large commercial bank business. The reason: IBM has been attempting to lock in users with its proprietary and complex Systems Network Architecture (SNA) and Series 1 minicomputers, the report said.

Priced at \$1,250, the report is available from SBS Publishing, Suite 190, 4320 Stevens Creek Blvd., San Jose, Calif. 95129.

Executive Corner

- Sperry Rand Corp. has named Gerald G. Probst group executive vice-president for computers, business equipment, defense and aerospace operation. Richard L. Gehring has succeeded him as president of Univac, while remaining an executive vice-president of the corporation.

- Manuel Garcia has been named senior vice-president of NCR Corp.'s U.S. Data Processing Group.

- Torrey Everett has been appointed vice-president of finance at Logical Machine Corp.

- Alvin Schneider has been named vice-president of sales at STC Systems, Inc.

- Dr. Lindsay Wang has joined Inter Systems, Inc. of Arlington, Va., as technical director.

- John T.M. Pryke has been appointed manager of new markets development at Compu-graphic Corp.

- Kenneth W. Draeger has been appointed a corporate vice-president of Automatic Data Processing, Inc.

- Bob Field has joined Zilog, Inc. as vice-president of marketing.

- Don Mattson has been promoted to vice-president of product operations and Milo L. Cermak has been appointed vice-president of international marketing at Information Terminals Corp.

- Gordon Peterson, director of marketing, and Sven Behrendt, director of marketing/Europe, have been promoted to vice-presidents at Monolithic Memories, Inc. Max Chancellor has been promoted to vice-president of industrial operations.

- George A. Reed has joined Computer Systems of America, Inc. as executive vice-president, responsible for directing lease financing and documentation.

- Robert C. Ludwig, Gerald Loev and Jude T. Gartland have been appointed vice-presidents at Index Systems Inc. of Cambridge, Mass.

- Ronald E. Peebles has been appointed vice-president of finance at Continental Computer Leasing Corp.

- Thomas B. Cramp has been named vice-president of finance for the Data Services Group of Computer Sciences Corp. Edwin T. Carlson has been named vice-president of plans and programs for the firm's Commercial Division.

- Peter LaBriola has been elected vice-president of commercial services at Applied Data Research Services, Inc.

- Three executives at Pertec Computer Corp. have been promoted to corporate vice-president positions. Paul A. Busse was named corporate vice-president and treasurer; Thomas H. Elrod was named corporate vice-president and

general manager of the Data Systems Operations Division; and William J. Frank Jr. was named vice-president of corporate planning. Merrill J. Ruge has joined Pertec as vice-president of industrial relations.

- Naim S. Aweida has been promoted to executive vice-president of field operations division at Storage Technology Corp.

- William R. Lennartz has assumed the presidency of Computer Power Systems Corp.

- Paul Gordon has joined Information Processing Directions, Inc. as a principal and vice-president.

- Donald E. Peebles has been appointed vice-president, network and engineering, and William R. Wofford has been appointed vice-president, customer services and systems, at GTE Data Services Inc. N.H. Hawkins has been appointed to the newly created position of vice-president of marketing for GTE Comp-Acct, Inc.

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CA to Open Irish Manufacturing Plant in July

By Marcia Blumenthal

CW Staff

NEW YORK — Computer Automation, Inc. will begin its first full-scale overseas manufacturing operation with the opening of a plant in Dublin, Ireland, in July.

Starting with production of the Syfa network processing system, Computer Automation Ireland Ltd., a wholly owned subsidiary, will phase in the entire CA product line, over the next three years, according to a spokesman for the Industrial Development Authority Ireland (IDAI).

Despite the doubling of facilities in Irvine, Calif., in early 1977, CA President David H. Methvin said, "sales

continue to outstrip manufacturing capacity. It was decided to spread operations geographically in order to be closer to readily available labor pools and customers."

Output from the Ireland plant will primarily supply customers of the European Common Market.

By locating the facility in Ireland, CA will benefit both from the elimination of tariffs among Common Market members and from the financial incentives provided by the Irish government to companies establishing subsidiaries there.

One of the incentives is the absence of taxes on profits made from sales of exported goods. In addition, Irish gov-

ernment contributes a portion of the fixed assets (usually 25% to 35%), which is considered a nonrepayable capital grant.

Bottom Line

The bottom line for IDAI is the creation of jobs, and IDAI foots all the bills for training nationals, including transportation for U.S. trainers.

Stuart F. Dale, CA corporate vice-president for product planning, will head up the operation in Ireland. Dale, the only CA employee to be transferred to Ireland, said CA's goal is "to recruit manufacturing, engineering and administrative personnel locally

and turn management over to Irish nationals as rapidly as is practical."

Employment at the plant is expected to exceed 600 within five years, IDAI reported.

Geoffrey Salkeld, CA corporate vice-president, has been assigned the overall responsibilities for European sales and marketing activities, which include direct sales and customer support by CA subsidiaries as well as agreements with international distributors.

Other computer companies — including Digital Equipment Corp., Amdahl Corp., Data 100 Corp. and Analog Devices, Inc. — have already opened operations in Ireland.

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Earnings Reports

BUNKER RAMO Three Months Ended March 31			
	1978	1977	
Shr Ernd	\$.46	\$.23	
Revenue	85,830,000	82,999,000	
Earnings	2,923,000	1,568,000	

STORAGE TECHNOLOGY Three Months Ended March 31			
	1978	1977	
Shr Ernd	\$.65	\$.37	
Revenue	54,244,000	32,182,000	
Earnings	3,549,000	1,849,000	

TALLY Three Months Ended March 31			
	1978	1977	
Shr Ernd	\$.17	\$.21	
Revenue	8,284,000	6,433,000	
Tax Cred	182,000	
Earnings	460,000	568,000	

TELENET Three Months Ended March 31			
	1978	1977	
Revenue	\$1,479,000	\$693,000	
Loss	1,106,000	961,000	

TEXAS INSTRUMENTS Three Months Ended March 31			
	1978	1977	
Shr Ernd	\$1.35	\$1.20	
Revenue	557,552,000	461,921,000	
Earnings	30,699,000	27,344,000	

COMPUTER AUTOMATION Three Months Ended April 2			
	1978	1977	
Shr Ernd	\$.89	\$.82	
Revenue	17,075,000	12,056,000	
Earnings	1,763,000	1,621,000	
9 Mo Shr	2.32	1.78	
Revenue	43,601,000	29,986,000	
Earnings	4,609,000	3,489,000	

COMPUTER COMMUNICATIONS Three Months Ended March 31			
	1978	1977	
Shr Ernd	\$.24	\$.15	
Revenue	5,078,527	3,581,148	
Tax Cred	360,000	220,000	
Earnings	742,906	461,306	
9 Mo Shr	.56	.45	
Revenue	13,018,466	10,002,762	
Tax Cred	820,000	640,000	
Earnings	1,701,179	1,336,776	

COMPUTER SCIENCES Year Ended March 31			
	1978	1977	
Shr Ernd	\$.97	a\$.98	
Revenue	276,912,000	234,745,000	
Spec Cred	3,000,000	
Earnings	13,880,000	14,635,000	
3 Mo Shr	.28	a.26	
Revenue	77,465,000	63,168,000	
Spec Cred	750,000	
Earnings	3,851,000	3,870,000	

CRAY RESEARCH Three Months Ended March 31			
	1978	1977	
Revenue	\$1,331,926	\$508,974	
Loss	210,906	487,570	

CUBIC Three Months Ended March 31			
	1978	1977	
Shr Ernd	\$.71	\$.49	
Revenue	36,077,300	29,132,500	
Earnings	2,088,000	1,433,800	
6 Mo Shr	1.28	.97	
Revenue	67,076,600	56,815,600	
Earnings	3,765,600	2,829,100	

INFORMATION MAGNETICS Three Months Ended April 1			
	1978	a1977	
Shr Ernd	\$.02	\$.21	
Revenue	7,102,000	7,541,000	
Disc Op	25,000	(176,000)	
Earnings	37,000	399,000	

a-Restated to reflect discontinued operations.

LEAR SIEGLER Three Months Ended March 31			
	1978	1977	
Shr Ernd	\$.69	\$.55	
Revenue	290,489,000	270,982,000	
Earnings	11,695,000	9,114,000	
9 Mo Shr	1.82	1.39	
Revenue	825,516,000	627,047,000	
Earnings	30,717,000	23,157,000	

DIGITAL EQUIPMENT Three Months Ended April 1			
	1978	1977	
Shr Ernd	(000)	(000)	
Revenue	\$.87	\$.72	
Earnings	374,769	282,727	
9 Mo Shr	36,986	27,991	
Revenue	2.31	1.73	
Earnings	1,024,010	728,289	
Earnings	95,871	67,392	

DOCUTEL Three Months Ended March 31			
	1978	1977	
Shr Ernd	\$.04	
Revenue	6,845,028	\$6,208,947	
Tax Cred	52,914	
Earnings	107,987	(157,782)	

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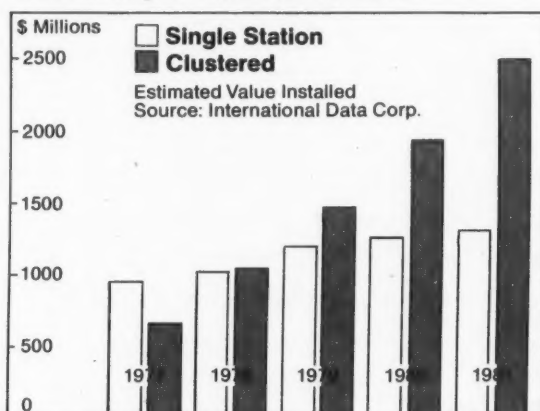
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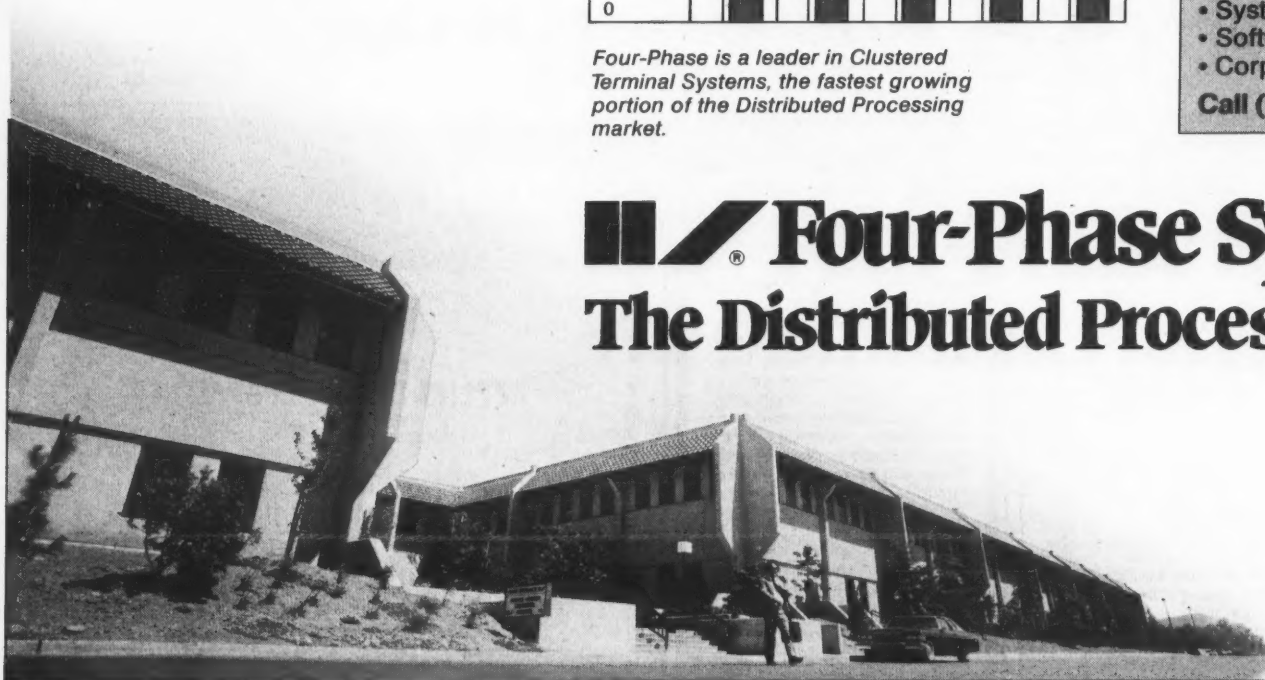
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We're looking for Systems Programmers whose talent, experience and dedication are not utilized in their present jobs.

As the makers of SyncSort — the fastest-growing, high-technology sorting programs available — we offer outstanding opportunities for professional growth, financial advancement, personal satisfaction.

If you join us, you'll learn to provide creative customer service to many of the best-known companies on the Fortune 500 List. You'll investigate and solve operating-system problems, trouble shoot and debug — in a growing department, of a growing company, of a growing industry.

We seek people with:

- At least one year's BAL programming experience;
- Knowledge of OS and OS/VS internals;
- A bachelor's degree.

We offer excellent starting salaries and benefits, and a congenial, highly professional working environment in a pleasant suburban setting.

If you feel you qualify, and have a desire to break into the clear at last, send a confidential resume to:



WHITLOW COMPUTER SYSTEMS Inc.

560 Sylvan Ave., Englewood Cliffs, N.J. 07632

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OVERSEAS TO \$45K IRAN

Our client is an international engineering firm with excellent opportunities to offer senior level Data Processing professionals with expertise in the following:

- IMS Cobol Programmers
- Satellite Data Base Specialists
- Regional Planner
- Systems Analysts
- Sr. EDP Supervisors
- Data Base Administrators

The positions all are working with state-of-the-art hardware and software. They offer 18 to 24 month contracts for Tehran. Fee Paid.

For more information on these assignments, mail resume with salary history to:

Sylvia B. Long
(213) 378-1831
(213) 990-1875

LMC Agency, Inc.
15910 Ventura Blvd. #800
Encino, CA 91436

Programmer Analyst

Robertshaw Controls-May 29

We seek a qualified individual to fill this key position in our Richmond headquarters. Will assist in the analysis, development and programming of computer systems. Prepare necessary systems and program documentation. Must be able to communicate effectively with users; and program proficiently in COBOL, BASIC and Teleprocessing a plus. Degree preferred with experience in programming and systems analysis.

Liberal starting salary. Excellent benefits.

Reply in writing stating qualifications to A.J. Falco, Personnel Manager

Robertshaw Controls Co.

P.O. Box 27606
Richmond, Virginia 23261
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DATA PROCESSING PROFESSIONALS

Analyst/
Programmers
-San Francisco-

Immediate opportunities working with Crocker Bank's Time Sharing Service. Strong minicomputer technology and/or time sharing industry background and good communication skills req'd. Exp. with PDP 11-70, RSTS/E, BASIC+, BASIC +2 desirable.

Please send resume, including salary history & requirements to Sheron Sullivan, Sr. Employment Representative, CROCKER BANK, Operations Division, P.O. Box 38012, San Francisco, CA 94138. Individuals only apply.



CROCKER BANK

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The big move is to NCR

Now in San Diego: 30 new openings on a major software project

NCR has moved to the forefront among the Big Three mainframe manufacturers, and the telecommunications projects at San Diego are one of the reasons why. We are now developing on-line data communication networks for financial and retail systems. Many assignments have been created in data communication software development. You can move in immediately to share the challenge—and the rewards.

The magnitude of the telecommunications network project and the importance NCR management has assigned to it can be measured in the number of software professionals we have recently hired and are adding to our San Diego team. The large number of openings also increase the likelihood of finding just the position that fits your background and your interests... an advantage for both of us.

Check your previous activities in the following areas. We have assignments

at middle to high levels requiring 2 years or more of experience in one or more of these:

TELECOMMUNICATIONS SOFTWARE

Communication Disciplines

- Store-and-forward message switching
- Packet switching
- SDLC
- Bisync protocols
- Async protocols
- X.25
- Software development

Network Development

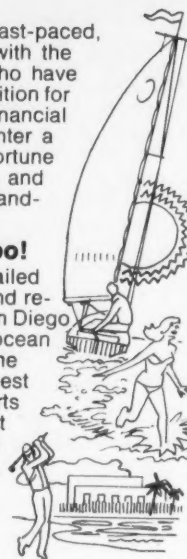
- Host-to-host, node-to-node, and end-to-end protocols
- Minicomputer operating systems
- Assembly language

Where the action is

You will be working in a fast-paced, stimulating environment with the kind of high achievers who have staked out a dominant position for NCR in the business and financial EDP markets. You can enter a crucial program at an opportune time to show your talents and move up in the rapidly expanding NCR organization.

... and San Diego too!

Do we have to paint detailed pictures of the beauties and recreational riches of our San Diego situation? A mile from the ocean and only minutes from the features of one of the finest year-round vacation resorts in the country. If you don't know firsthand about San Diego's delightful lifestyle, send your resume, come and see us, and prepare for a moving experience.



Please submit your resume with salary history to Caesar Namba, Employment Specialist

An equal Opportunity Employer

NCR
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TORREY PINES**

4063 Sorrento Valley Blvd., San Diego, Calif. 92121
(714) 452-1020

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Computer Sciences Corporation is developing solutions to complex systems problems for some of the world's most substantial manufacturers of computers. With the expanded capabilities of recently developed computers to handle Magnetic Ink Character Recognition (MICR) for financial institutions, and the volume of checks processed increasing at an annual rate of 7 percent, the software problems are receiving considerable attention and that's where you come in.

Immediate openings for individuals with experience in:

- MICR Magnetic Ink Character Recognition Equipment
- IBM 3890 1419
- CPCS Check Processing and Control Systems
- IBM Selector Channel Protocol to 3890 Document Processor.

We will provide you with a highly visible career, attractive benefits package, and outstanding compensation.

For immediate consideration, please submit detailed resume, including salary history, or call:

Mark D. Havard
Toll Free: (800) 336-0173

Systems Division

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Falls Church, Virginia 22046
Major Offices and Facilities throughout the World
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DATA PROCESSING

A major Chicago-based railroad is expanding its information systems center. We have an OS/VS shop with IBM 370 hardware. The following career positions are available:

Systems & Programming Supervisor

To plan, develop and lead a section in systems and programming activities. Qualified candidates should have:

Five years' experience in systems and COBOL programming. An appropriate college degree. Major system design or installation experience. Knowledge of large computer job control language.

Lead Programmers and Programmers

Qualified candidates should have:

One to three years' systems and COBOL programming experience. An appropriate college degree. Knowledge of large computer job control language.

Systems Analyst

Qualified candidates will have:

Two years' experience as a systems analyst. An appropriate college degree. Ability to interact with user personnel.

Communications/Hardware Specialist

Qualified candidates will have:

Two years' experience programming mini computers, or Two years' experience designing hardware configurations for teleprocessing system, or A years' experience installing major information systems on minicomputers. An appropriate college degree.

We offer competitive salaries and have excellent fringe benefits.

If you are qualified in one of the above areas, wish to work with the latest equipment and techniques in a modern office environment, please submit a resume with salary history to CW Box 1578, 797 Washington St., Newton, MA. 02160.
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COMPUTER SYSTEMS ENGINEERS

NCC INTERVIEWS

One of the country's leading diversified financial services located in New York City is seeking individuals with experience in systems engineering, software design and equipment planning.

Director-Equipment Planning

The individual we are seeking will have broad equipment planning experience including IBM mainframes and peripherals, minicomputers, EFTS and office automation equipment. An engineering degree and software experience is highly desirable.

Systems Engineer/Software Specialist

The position requires experience in minicomputer and microcomputer systems architecture. The individual we are seeking will have experience in operating system design for minicomputers preferably in a fail-soft environment.

Systems Engineer/Performance Analyst

This position requires an individual who can work with decentralized computer installations in developing an on-going performance measurement and capacity planning program. The position requires experience in an IBM-MVS environment. Experience with IMS and/or CICS is highly desirable. Up to 50% travel is required.

Excellent salaries commensurate with experience. Fine benefits package.

To arrange for an interview at NCC call Ms. Kathy DiFiore, collect, at (212) 480-2891. If you are not attending the NCC, send your resume to Ms. Kathy DiFiore, American Express Company, 125 Broad Street, New York, New York 10004.



American Express

Card Division

An equal opportunity employer, m/f

Software/Hardware Professionals

We're coming to tell you how NCR makes easy upward migration a reality.

More than a dozen senior level technical managers will be in Anaheim June 5th thru 8th. Contact us if you want to be briefed on one of the most far-reaching staffing operations in recent times.

NCR's "Easy Upward Migration" describes the way our interactive, real-time "Total System" computers are designed to be upgraded into higher-level systems without scrapping equipment or programs. **And it just as accurately describes career paths at NCR.**

We're a "Big Three" computer manufacturer in a hurry. Demand for our pioneer, business-oriented distributed data processing networks and micro-mini-mainframe systems is accelerating. Upward migration paths at NCR are wide open, and we're moving people up faster than they've ever been moved before. We're searching for ambitious, impatient, upward-bound software/hardware pros who are capable of climbing rapidly into management.

We're prepared to discuss **all** of the openings listed below—and others throughout the **entire** NCR Corporation. Talk to us. Phone for interview information—

Immediate Openings—Software

• Distributed Network Architecture

Design and application of an advanced communications network architecture to meet distributive processing needs of the 1980's. Experience desired in teleprocessing, system architecture, network processing, transaction processing.

• Transaction Processing

Design/Implement transaction processing facilities—parallel tasking, interprocess communications, system recovery. Project leader position available.

• Interactive Processing

Design/Implement interactive processing facilities of large, general-purpose O/S—text editor, interactive compilers, program development tools.

• Data Base

Design/Implement DBM software. Experience desired in relational, network, or hierarchical data base internals. Project Leader position available.

• Software Engineering

Prepare and coordinate a plan for migrating system software development (medium-to-large scale O/S) to a high level language.

• File Access Methods

Design/Implement high performance access methods in a storage hierarchy environment.

• Performance Measurement & Analysis

Use analytical and empirical tools to identify tuning opportunities and evaluate design alternatives in areas such as distributed processing, data base and transaction processing.

• Operating System Development

Design/Implement multiprogramming, virtual storage O/S on uniprocessor and multi-processor configuration.

• Compiler Design/Development

• Firmware

Project Lead/Analysts

• Diagnostic Programming

Design, develop programs to support software testing, release and repair.

• Test Systems Development

• MIS Applications

• Software Quality Assurance

• Configuration Management

Design, Test, Integration

• MICR Proof Of Deposit Software

• Design Automation

• Systems Architects

Future EDP Systems

Immediate Openings—Hardware

• MICR/OCR/OMR Engineers

• Design Automation Engineer

• Memory Device Engineer

• Logic Design Engineers

CPU and peripheral controllers (microcoding for I/O subsystems)

• Functional Specifications

I/O subsystems; integration

• Components Engineer Semiconductors

Digital ICs, microprocessors

• I/O Subsystem Configuration

Technical lead

• Systems Integration Test

• Design Engineer—Peripherals

• Design Engineer—R & D

Systems architecture

• Design Engineer—Power

I/O adapters and power supplies

• Design Engineer—Communications

Distributive processing networks

• Mechanical Engineer—Electronic Packaging

• Test Systems Development

• Product Engineers

Mechanical, optical, electrical associated with introduction of new computer file storage devices into factory production.

Interviews June 5-8

Meet us at the Grand Hotel opposite the main gate to Disneyland.

Call (714) 772-7777 to arrange a convenient appointment Monday through Thursday, 9AM to 9PM

If you cannot meet us at the National Computer Conference, contact the following for specific information at these and other NCR locations throughout the country:

San Diego:

Professional Placement Dept.
NCR Corporation
Engineering & Manufacturing,
16550 W. Bernardo Dr.,
San Diego, CA. 92127

Wichita:

Professional Placement Dept.
NCR Corporation
Engineering & Manufacturing,
3718 N. Rock Road,
Wichita, Ks 67226

NCR

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HERE'S TO THE GOOD LIFE!

(And some very good jobs for some very good Engineers in our fast-growing, almost \$40-million company.)

The "good life" may well be an understatement. We're located in the foothills of the scenic Ramapo Mountains so you can live the life of a country squire yet be just thirty easy miles from the glamor and clamor of New York City. Less than half that to the all-season Meadowlands Sports Complex. And throughout our area, the housing is plentiful, shopping and recreational facilities easily-accessible and the schools excellent. But just as our location offers ideal living conditions, our company offers equally ideal growth conditions.

A key subsidiary of Western Union Corporation, our success stems from maintaining state-of-the-art technology and applying it to leasing and servicing a full line of high and low speed teleprinter, video and intelligent terminals. This, coupled with our systems approach to service and our increasing dominance in the areas of electronic mail, communicated word processing and sophisticated word/data entry systems keeps us ahead of the competition in a very competitive industry. To stay ahead and accelerate our growth, we're seeking some growth-oriented individuals who may also be seeking that every-illusive "good life". We have it, if you have the professional skills we need:

SOFTWARE SYSTEMS DESIGNERS "INTELLIGENT" COMMUNICATIONS TERMINALS DDP

You'll have at least four years' experience backed by a BSEE or equal and the ability to design and spec multi-tasking, multi-programming operating systems. Areas of heavy concentration should include: Primitives, table layouts, queuing, calling sequences, I/O drivers and handlers and file access methods. In addition, you'll have a well-developed working knowledge of communication protocols, high level language intervals and organization techniques.

An MSEE in Computer Science, Engineering or Math will help greatly in carrying out your responsibilities which include the specification, design, writing, debugging and documentation of software for "intelligent" communications terminals, distributed data processing (DDP), word processing and electronic mail.

SYSTEMS ENGINEERS INTERFACE WITH MARKETING

The highly-skilled Systems Engineers needed to help us grow will have critical responsibilities in our aggressive sales/marketing program. Each should have Computer Sciences or equal. You should have communications computer systems and field sales experience with end users and know communications protocols, facilities, modems, systems design, computer operation, applications system design and programming. In addition, you'll be better able to carry out your substantial duties if you're familiar with micro-processing programming of user applications and have experience in IBM as well as other types of software.

You'll provide systems engineering support in the analysis, design and implementation of terminal communications systems and a technical support program. Responsibilities include: sales assistance, customer service, systems implementation account responsibility, staff and field sales assistance (communications protocol and applications software), and sales support telephones.

WE'RE ASKING A LOT; WE'RE GIVING A LOT

Excellent salaries commensurate with experience, plus a continuing bonus package and a full benefit package for you and your family. For an immediate interview, call Mr. Hansen, at:

(800) 631-7050 Ext. 423

In N.J. Call COLLECT: (201) 529-1170

Or send your resume and salary history, in confidence, to: Personnel-CW.

WESTERN UNION DATA SERVICES

70 McKee Drive, Mahwah, New Jersey 07430

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Data Processing

TECHNICAL SUPPORT MANAGER

Proven management and technical ability required to manage all activities related to Data Processing Technical Support function of a Virginia based bank holding company. Responsibilities include participation in short term and long range planning, implementation and maintenance of Systems Software, functional guidance and training, and new systems and technology. IBM 370 DOS/VS GRASP Environment with switch to POWER. Banking experience required. Excellent salary and benefits package. Send resume in confidence with salary requirements to:

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797 Washington St.
Newton, MA 02160

CUSTOMER SERVICE ENGINEER

The Company

Computer Communications, Inc., a southern California-based corporation and leader in state-of-the-art data communications.

The Position

Customer Service Engineer, to support our major client sites in the following areas:

- Erie, Pennsylvania
- Miami, Florida
- New York City
- Northern New Jersey
- San Francisco Bay area

We offer a high starting salary (well above that for comparable positions) and an excellent benefits package that includes a dental plan.

The Candidate

A highly skilled career-oriented individual who possesses two-to-three years' experience with minicomputers, troubleshooting ability to the component level, and IBM or equivalent channel experience. First-hand teleprocessing and front-end or message switching knowledge is necessary.

The Contact

For immediate and confidential consideration, please contact our National Recruiter by calling collect or sending a resume:

Bob Denenberg
(213) 274-5328
9701 Wilshire Blvd., Suite 805
Beverly Hills, CA 90212

Equal Opportunity Employer M/F

Key Positions In COMPUTER OPERATIONS

Georgia-Pacific is seeking Data Processing professionals to handle key assignments in growing Computer Operations department. You will be located at the corporate headquarters in Portland, Oregon.

Career Opportunities For Field Service Manager

Require experience in networking and data communicating. Must have worked PDP8's and 11's. Prefer 3-5 years' experience. Need excellent oral and written communication skills, and be able to establish and maintain good rapport with field personnel.

Production Control Analyst

Entry level position in operations software support. Will be monitoring RSTS and RSX operating environment. Must have experience DEC equipment and working knowledge of RSTS and RSX helpful. Prefer college degree in Computer Science with Business Administration emphasis or equivalent experience.

We offer excellent opportunities for advancement, commensurate salary and an excellent fringe benefits package.

Send your resume including salary history in confidence to:

Georgia-Pacific

Personnel Department
900 S.W. Fifth Avenue
Portland, Oregon 97204

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send your resume to me at Robert Half Personnel Agencies, 4801 Woodway, Suite 231W, Houston, Texas 77056.

PROGRAMMING

Systems Software Analyst

San Diego Opportunity

Burroughs's rapidly expanding Micro-Components Organization in Rancho Bernardo (a San Diego suburb), has a highly visible position available for a seasoned software professional.

You will be responsible for providing overall technical coordination between our data center and on-line users, and for developing systems programs for use in technical applications.

The ideal background will include experience on the B6700 and familiarity with ALGOL. If your experience does not include use of the B6700, strong consideration will be given for experience in operating systems and compiler support.

Burroughs offers career challenge in addition to an excellent salary and generous benefits package, including a liberal relocation allowance.

For immediate consideration, please send a resume including salary history, in confidence to: Professional Employment, Burroughs Corporation, 16701 West Bernardo Drive, San Diego, CA 92127. We are an equal opportunity employer m/f.

Come work with us in San Diego.

Burroughs

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Project leader-acctg to 25K
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Programmers to 19K
Scientific Prog-FORTRAN to 22K
Operations research to 23K
Computer scientists-PhD to 25K
Software designers-BSEE to 23K
Vendor support to 26K
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All openings are in the PACIFIC NORTHWEST and ALASKA. Industries include manufacturing, service and retail groups.

All inquiries handled in strict confidence.

For information, call or write Al Friedman or Jim Klassen, (206) 455-8300, Executive Resources, Inc., 310 108th Ave. N.E., Bellevue, WA 98004

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Sys Analyst 26
Exp. with marketing, financial or mfg. systems.
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Exp. with large-scale IBM operating systems and utilities.
Or Analyst 20
Major mfg. concern requires 1+ yrs. exp. prefers MBA
Sys Programmer 17
DOS, CICS, Assembler, 1+ yrs.
Sys Programmer 21
370/155 OS CICS, 2+ yrs.
Prog/Analyst 22
4+ yrs exp. incl on-line IMS
Prog & P/A 15-22
COBOL, DB or on-line a plus

These positions represent several clients including Fortune 500. They are located in a variety of geographical areas primarily in the midwest. Call Ron Bell.

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Our client, a PHILA area FORTUNE 100 GIANT, seeks talented PROG/ANALYSTS w/3+ yrs ANS COBOL from lge scale IBM OS/VS environ. IMS exp a +. Unique oppty w/ planned career path. Depending upon exp; salary to: \$23,000

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Whether you make it to this years' National Computer Conference may not be really important. What IS important is your career and how you can advance it; at the show, during the show, after the show . . . or now!

If you come to the show come by and see our extensive line of computer graphic terminals systems. See for yourself why we are the undisputed leader in the marketplace: From manufacturing to marketing to service. And while you are there take some time to talk to one of our professionals about joining our team. Because of our dynamic growth we currently have openings throughout the United States for additional sales managers, sales engineers, and systems analysts. There is no better time than now to join Tektronix and perhaps for the first time in your career, get with the leader.

Don't wait for the show. Call our toll free number now, and we'll arrange a personal interview for you now, during the show, or after the show. Our current openings include:

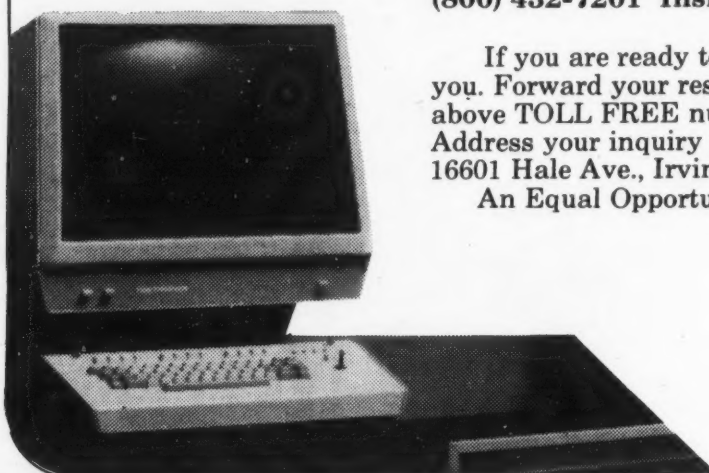
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OEM Sales Engineers
Sales Engineers
Systems Analysts**

Call us now.

(800) 854-0525 Outside California
(800) 432-7201 Inside California

If you are ready to put your talents to work, let's hear from you. Forward your resume or summary sheet or call one of the above TOLL FREE numbers, listing your area of preference. Address your inquiry to Tod Sorensen, TEKTRONIX, INC., 16601 Hale Ave., Irvine, CA 92714.

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COMMITTED TO EXCELLENCE

PROGRAMMER/ANALYSTS

Contract Salaries
\$12 to \$18 \$20 to \$30K

Base Requirements: Five years programming
Three years COBOL
Medium to Large Scale Hardware

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(Contract) Total Checks X \$1.00 + \$12.00 = Hourly Rate
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(313) 353-5258
V. Huff
23950 Brookplace Ct.
Farmington Hills, Mich. 48024

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Sr. Sys Engineer \$24,000
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ALC, MV5, CICS, T50

If you are in the insurance field, we'd like to hear from you.

Jack Edwards Associates
Suite 600
8150 Leesburg Pike
Vienna, Virginia 22180
(703) 821-0688
Insurance Personnel

HARRIS SEMICONDUCTOR is a division of Harris Corporation - a Fortune 500 company in the communications and information handling markets. Continued expansion has given us the following new position:

MINI COMPUTER SYSTEMS PROGRAMMER

You should be familiar with operating system generation, hardware/software troubleshooting, and telecommunications. On-line hardware exposure should include minicomputers, preferably Harris, DEC, or Data General. Experience with the VULCAN operating system as well as FORTRAN, COBOL, ASSEMBLER and TOTAL Data Base Management is very desirable.

We are looking for career oriented individuals who appreciate stable employment and the opportunity for professional growth. Come work where tennis, golf, and fishing can be enjoyed year-round. Harris Semiconductor is located in the sunny Atlantic ocean community of Melbourne, just one hour East of Orlando. Send resume with salary history and requirements to:

Steve Heise

HARRIS SEMICONDUCTOR
Dept. 56, P.O. Box 883, Melbourne, Florida 32901



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DATA PROCESSING PROFESSIONALS SAN FRANCISCO



We're an International Leader in the field of Engineering and Construction Management. If you're looking for outstanding business and engineering-oriented opportunities in a professional data processing environment, we have them. If you have a minimum of two years' experience in one of the following categories, we'd like to talk to you:

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Business & Engineering Systems
- **BUSINESS PROGRAMMER ANALYSTS-**
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- **ENGINEERING PROGRAMMER/ANALYSTS-**
Proficient in FORTRAN
- **SENIOR SYSTEMS PROGRAMMERS-**
UNIVAC 1110 Operator System - EXEC 8

Please call (415) 768-5942
or write:

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Bechtel Corporation
Dept. 15-12-8
P.O. Box 3965
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DIRECTOR OF DATA PROCESSING

Position open for a Director to manage a growing and innovative data processing function and department - staff of 6 computer programmers - in a rapidly expanding health maintenance organization. This position includes management responsibilities for operating, coordinating, planning and programming diverse state-of-the-art medical and medical/administrative systems, including the nationally acclaimed computer stored ambulatory record system (CO-STAR).

Requirements include demonstrated skills and experience in management, leadership staff development, supervision, interpersonal relations, project management and planning. Areas of desired technical understanding and experience include file and data base design; on-line interactive processing in support of a large number of users; hardware/software planning; minicomputer experience with equipment such as DEC 1170's, Data General Eclipses, etc. Experience with MUMPS software in the medical field desirable but not essential.

Send resume with current salary to Margaret Ives.



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Allston, MA 02134
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We have an excellent opportunity in our successful computer trade show for an experienced sales representative. You'll be working with computer companies on the Eastern seaboard in the sales of exhibit space in our nationwide exposition. Your territory will include megalopolis from Fairfield County Conn., south, and about (25%) travel is involved.

To qualify, you should have a knowledge of the computer industry, experience in selling intangibles, and the ability to sell on the phone. Space sales or trade show experience is a plus.

We offer a good compensation plan, excellent benefits, profit-sharing, freedom from big-company bureaucracy, and the chance to be part of a very successful and growing family of companies.

To apply, send your resume (or a detailed letter) to Kim Wichert, The Conference Company, 60 Austin Street, Newton, MA 02160. The Conference Company is an equal opportunity employer.

**The Conference
Company**

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(In Mo. 1-800-892-7655)

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Sr. System(s) Analyst IMS/VS	\$20-26K
Project Leader IMS/VS	\$20-28K

TECH SUPPORT:

IMS Sys. (Prog(s) PB's-DB's	\$17-24K
COMTEN Analyst(s)	\$17-24K
Sys. Prog(s) OS/MVS INTERNALS	\$18-24K
Sr. Sys. Prog(s) MVS/OS INTERNALS	\$22-28K

All fees, costs, and temporary living expenses are paid by the companies. U.S. Citizenship required. "A POSITIVE EEOC AGENCY"



Contact Bill Denny, V.P.

Jim King and Associates

438 Gulf Life Tower/Jacksonville, Florida 32207
(904) 398-7371

Systems Analysts with experience in IMS

Leading international chemical corporation has a number of newly created career opportunities now available in its expanding Data Base environment. Requirements include:

- Proficiency in the use of COBOL and/or PL-1
- 4 years experience in systems design
- 2 years experience in IMS applications programming
- Skill in the use of IMS related utilities and debugging technique
- Experience in the design of IMS Data Base Systems.

These positions are available in Corporate Systems Support at our facility in Westchester County, New York. The individuals selected will act as Internal Consultants to site and remote location groups in the design and analysis of integrated batch and on-line systems, as well as participate in the Data Base administrative function.

We are now in the process of upgrading the current twin 370/158 MVS/MP environment. An outstanding benefits package (including relocation assistance where necessary) will augment excellent salaries.

For immediate consideration, please send detailed resume in strict confidence to: Robert Greco, Personnel Administrator, CIBA-GEIGY Corporation, Saw Mill River Road, Ardsley, New York 10502. We are an equal opportunity employer m/f.

CIBA-GEIGY

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The Search Is Here

Honeywell Interviews June 5-8

Honeywell's highly successful nationwide Search for the best computer professionals in the industry is coming to The National Computer Conference.

All across the country, professionals from a wide range of large and small companies—including our chief competitors—have responded to The Search. And when they took a close look at Honeywell and where we're going, they decided that *here* is where they wanted to be.

Now The Search is coming to The National Computer Conference. Throughout the conference (June 5-8), you'll have a chance to talk with Honeywell managers and other key personnel about where Honeywell is taking computers and what we can offer you. Our Small/Medium Information Systems Division (S/MISD) and our Large Information Systems Division (LISD) are continuing to grow rapidly and have exciting career growth opportunities available in a broad range of areas.

So while you're at The National Computer Conference, find out why The Search—and Honeywell—are so successful.

LARGE INFORMATION SYSTEMS—Phoenix, Arizona

Micropackaging Engineers
Logic Engineers
Diagnostic Engineers
Quality Control Engineers
Central Systems and Communications Analyst
Software System Test Engineers
Software Analyst

LARGE INFORMATION SYSTEMS DIVISION—

Los Angeles Development Center
Systems Programmers

SMALL/MEDIUM INFORMATION SYSTEMS DIVISION—

Billerica, Massachusetts
SOFTWARE DEVELOPMENT ENGINEERING
Software Test Engineer
Software Systems Design Engineers
Software Technical Support Engineers
O/S and Communications Development Engineers
Networking and Communications Engineers
Terminal and Network Applications Engineers
Compiler Development Engineers

HARDWARE DEVELOPMENT ENGINEERING

Circuit Design Engineers
Terminals and Communication Definition Engineers
Software/Hardware Writers
Hardware/Firmware Engineers
Terminal Engineers

LEVEL 6 MINICOMPUTERS

Sales Engineers
Systems Analysts
Market Analysts/Planners

SMALL/MEDIUM INFORMATION SYSTEMS DIVISION—

Brighton, Massachusetts
MANUFACTURING SUPPORT

PCB Assembly Engineers
Process Control Engineers
Vendor Engineers
Process Engineers

Even if you're not looking for a new position, don't pass up this opportunity to see for yourself what all the excitement is about.

NCC Interviews

To arrange for an interview during The National Computer Conference, please call Lou Sinagra for S/MISD positions or Stel Fedor for the LISD positions at the Griswold/Anaheim at (714) 956-4978.

Or drop by our Career Hospitality Suite at the Griswold/Anaheim. Limousine service will be provided from the Convention Center to the Griswold/Anaheim all during the conference.

If you are unable to meet with us at this time, please forward your resume, including salary history, and indicating position or positions of interest to:

FOR S/MISD POSITIONS

Mr. Lou Sinagra, HONEYWELL S/MISD, BM-002, 300 Concord Road, Billerica, Massachusetts 01821

FOR LISD POSITIONS—PHOENIX

Manager, Recruitment & Placement, HONEYWELL, P.O. Box 6000, M/S Y-150, Phoenix, AZ 85005

FOR LISD POSITIONS—LOS ANGELES

Ms. Martha Andreani, HONEYWELL, Los Angeles Development Center, 5250 West Century Blvd., Los Angeles, CA 90045

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If your ready to advance your career in one of the newest most promising areas of the computer industry, we would like to discuss the possibilities in detail. Call:

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 Management Recruiters
 2929 Plymouth Rd.
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 Ph. # (313) 769-1720

Manager of Data Base/ Data Communications System Software

Clemson University is seeking a person with experience in Data Base and Data Communications Software to be responsible for maintenance and enhancement of existing system software which includes IDMS data base, VSAM, TCAM DIRECT, NCP & EP. Responsibilities also include the selection, installation, modification and maintenance of TP monitors such as SHADOW II, IDMS-DC, and CICS to fit diverse needs of a large system environment of University and traditional data processing on an IBM System 370 under MVS. Desired qualifications include a Bachelors degree in Computer Science or related field and several years participation in design, development and maintenance of system software. Salary range \$18,012 - 25,599. This position is designated as a System Design and Software Development Manager in the S.C. Classification System. Please send resume to:

Dr. C.J. Duckenfield, Dir., Clemson University, Computer Center, Clemson, S.C. 29631

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LARGE, MODERN, TECHNICALLY SOPHISTICATED data processing installation has requirements for OPERATING SYSTEMS SOFTWARE SPECIALISTS in the areas of SOFTWARE/HARDWARE PERFORMANCE MEASUREMENT AND SUPPORT OF VENDOR SUPPLIED OPERATING SYSTEMS PACKAGES. Experience with IBM 370/MVS/TCAM/VTAM/3705 and a COLLEGE DEGREE are desirable. Please submit resume including SALARY HISTORY or CALL

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Here's your opportunity to make maximum use of your 2 year background in large scale IBM systems under IMS. To qualify you'll need strong experience in:

**PL-1 or COBOL
(Under IMS or CICS)**

High Productivity

Any exposure to ALC, DEC, 3790 and systems for manufacturing, government, health insurance or similar industry a plus. As a member of our professional staff, you'll be rewarded with an excellent salary and benefits. For more information send a letter or resume to Don Breitfelder or:

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You know you can be more creative, more productive, more successful in every way if you're doing a job that fits you to a "T." That's how we see it, too, at GE.

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For example, are you turned on by:

- selling to top management?
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- installing effective programs?

Which areas are you strong in?

- management methods (MIS)?
- financial (banking, brokerage)?
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- inventory management?
- administrative operations (payroll, personnel)?
- engineering and technical processes?
- you name it.

Why is GE able to tailor a job to your measurements?

■ We are in a stage of widespread expansion of what has become one of GE's major market activities—DP services—so we have plenty (hundreds) of jobs to fill.

■ The scope of GE data processing services to the widest spectrum of commercial users poses needs for people who know their way around one or more of the many areas of business activity. All that we really want is your previous involvement in a major DP systems installation.

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Not only do you get a position that fits, the options remain open after you're in. Again, the large-scale expansion makes on-the-job changes possible—for example, from Technical Representative to Account Representative, from Programmer to Technical Representative, and so on. If you're now on the wrong track, GE offers an opportunity to re-route your career onto paths that lead to greater rewards.

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We have opportunities for experienced **Sales Representatives and Programmer/Analysts** (with emphasis on FORTRAN) in major cities coast-to-coast.

In Maryland, at our Headquarters center, we have opportunities for **IBM and Honeywell large-systems Programmers, Application Programmers and Programmer/Analysts** with FORTRAN and other hi-level language backgrounds; **Senior Marketing Specialists** who know how to develop a product and get it to the customer; and many other DP opportunities for ambitious people who want to match their own rapid growth rate with ours.

Send your resume and salary history to Manager-Employment, General Electric, Information Services Business Division, 401 N. Washington Street, Room 48D, Rockville, Maryland 20850.

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The Central Moloney Transformer Division of Colt Industries, a leading manufacturer of distribution transformers, seeks a responsible, aggressive professional to join in the development of manufacturing systems. Rapid growth requires staff expansion and offers challenging and rewarding opportunity for the successful applicant.

Central Moloney is located in both the southwestern sun belt area and southern Florida, offering pleasant living and working conditions.

Qualifications should include a B.S. degree in Computer Science or related field, at least three (3) years COBOL programming experience, working knowledge of IBM S/370 and DOS/VS, and experience in the development of manufacturing systems such as Inventory Control, Work-in-Process, Labor Costing and MRP. Knowledge of CICS and DL/1 also desirable.

Starting salary commensurate with experience, education and ability. Excellent fringe benefit package. Contact in confidence:

William R. Austin
Div. Mgr. Personnel
& Community Relations
Central Moloney Transformer Div.
P.O. Box 6608
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Requires 2-4 years current COBOL business applications programming.

We utilize OS/VS 1 systems on 370/158 and TONE/TSO. We offer competitive compensation and benefits, a challenging state-of-the-art environment, plus excellent location!

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ANNOUNCING A NEW POSITION:

DIRECTOR, INFORMATION SERVICES DEPARTMENT For a Major California County Government

The emphasis is on management and administrative skills, attitudes and orientation.

In a location overlooking San Francisco Bay, a group of department heads, a member of the Board of Supervisors, and the management consulting team of Jan and Paul Weber met recently to define the qualifications for a very special person: the Director of a new Information Services Department for Alameda County.

This new Department will play a major role supporting the delivery of criminal justice, welfare, health care, and other essential services to over one million people. It will combine the existing centralized Data Processing Center with a new Information Management Division, which will coordinate Countywide distributed systems, data bases, standards and training.

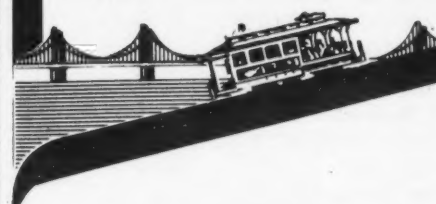
The Department's budget of ten million dollars will include a staff over 200, two 370/158's and a 370/155 serving more than 600 terminals in eight Bay Area counties. Distributed equipment will include twelve minicomputers, and more installations are planned.

Alameda County is located in a lively, beautiful, varied area of great culture, climate, history and dynamic change. It encompasses thirteen cities, including Berkeley, site of the University of California.

To meet the challenge of this position, the Director of the Information Services Department must have strength, intelligence and a flexible, innovative approach; be a good listener and an articulate, dynamic communicator; display and inspire trust; have a broad management background including data processing; work effectively in County government; understand current issues and future trends of this technical field; have a service philosophy and be able to instill it in others; be able to attract, select, and retain quality personnel; and be committed to affirmative action.

The position offers great challenge and equally great potential for success. Over a year of studies has set the stage for creating the Information Services Department on July 1, 1978. The Director should be aboard soon thereafter to take charge of the new Department and oversee the selection of an Assistant Director for the new Division. Recognizing the need for an exceptional individual, the County is offering a salary negotiable to \$45,000 and an extensive package of management benefits.

If you feel that you are this special person and that this challenging position will provide you with the growth and job satisfaction you are looking for, act now. Mail your resume to Tom Duncan, Alameda County Personnel, 1221 Oak St., Oakland, CA 94612. Or call him at (415) 874-7111. Alameda County is an Equal Opportunity/Affirmative Action Employer.



SYSTEMS ANALYSTS

The George Washington University has the following opportunities available for computer professionals:

SYSTEMS ANALYST — responsible for development, implementation, testing and maintenance of payroll/personnel systems and other applications. Requires 3-5 years' progressively responsible experience in systems analysis, including 1-2 years' computer programming in COBOL.

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Generous benefits including **FREE TUITION** for eligible employee, spouse, and dependent children. Please submit resume and salary requirements to: Employment Division, The George Washington University, 2125 G Street, N.W., Washington, D.C. 20052.



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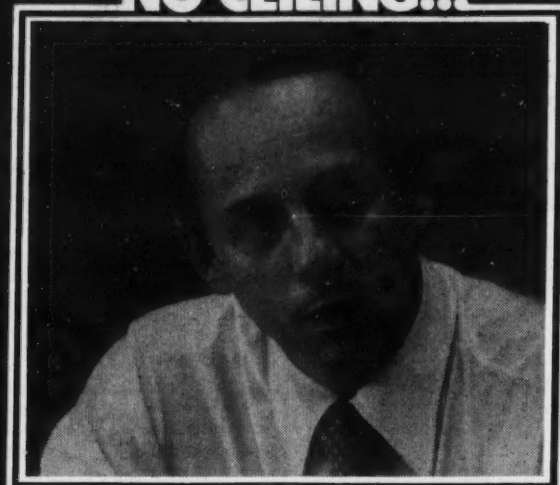
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The Electronic Systems and Geosciences Division of the Southwest Research Institute, one of the nation's largest independent organizations supplying applied R & D services in engineering and the physical sciences has an immediate opening for:

A Real Time Minicomputer Applications Programmer.

The position requires a desire to develop experience in using scientific instruments, data processing, data acquisition and process control. BS Computer Science degree with emphasis on Assembly language programming on real time systems are minimum requirements.

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ADR is the #1 software products company in the world. Founded in 1959, we have software installed at over 8,000 computer sites, more than any other independent software company. We are large enough to be stable and respected, small enough to be informal, with lots of room for recognition and advancement. We currently employ over 280 people and our annual sales exceed \$20,000,000. ADR has 8 branch offices in the United States and is represented in 35 foreign countries.

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ADR's diverse product line is state-of-the-art. Our systems range from on-line programming systems to language translators; from text processing to performance measurement. IBM technological advances are usually heralded by new ADR products. ADR software products are rated #1 in the 1977 Datapro survey — surpassing every other company in the number of products (4) honored by Datapro.

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ADR offers the comfortable, informal surroundings best suited to system development. At ADR, members of the technical staff average twelve years of computer experience. They constantly have opportunities to expand their professional skills into new technological areas. Our role as a pioneer in the software products industry gives our employees a unique position in the computer industry. At ADR, you are part of the leading edge of technology, not a follower.

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If you are a capable IBM Assembly language programmer and consider yourself a System Software Specialist, then you definitely should consider ADR. We have openings at all levels for qualified programmers and analysts who have the capabilities for developing sophisticated, state-of-the-art software.

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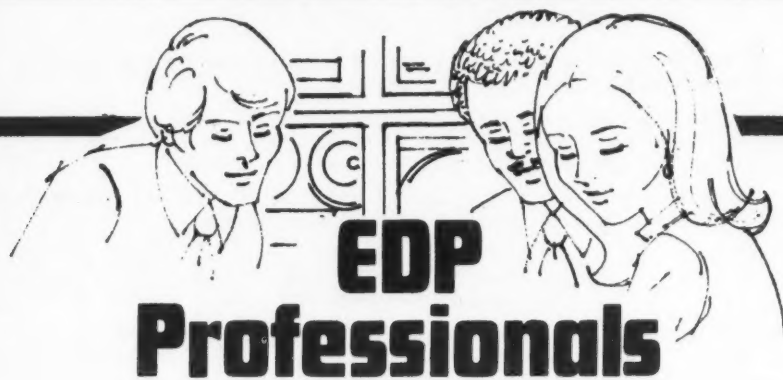
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You'll work in a state-of-the-art IBM 370/158, 168 MVS, CICS, DL/1 environment that is converting to mass storage and implementing a nationwide communications network. Immediate openings in our WORLD TRADE CENTER location include:

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Opportunity to develop a nationwide communications network. Two years experience in either TCAM, VTAM internals; 3705 internals; IBM communications internals; IMS internals or mass storage installation.

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Four-plus years EDP experience in a large-scale IBM OS environment with good working knowledge of ANSI COBOL, OS/JCL, PROCS and at least 1 year of systems design.

PROGRAMMERS-Senior & Intermediate

One to 4 years programming experience in an IBM 370/OS environment utilizing COBOL with good knowledge of TSO, OS/JCL and Utilities. CICS background a definite plus.

Appropriate degrees helpful; salaries are commensurate with level of responsibility and backgrounds offered. To investigate these opportunities, please send resume with salary history/requirements to Mr. David C. Rosner.



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• **Data Base Systems Coordinator**—Candidates must be capable of conducting basic and detailed design classes, customer interfacing, terminal and communication research and design data base application. 8 years experience or more.

• **Data Base Performance Specialist**—Candidates must be knowledgeable in data base recovery, IMS internals, utilities, accounting, transaction analysis, data base system maintenance, and problem determination. Hardware/Software. 5 years experience or more.

• **Data Base System Programmer**—Candidates must be knowledgeable in IMS internals, utilities, data base system maintenance and update and problem determination. (Software).

• **Senior Software System Designer**—Candidates must have 5 years experience and in-depth internal knowledge of operating systems software plus the ability to design and install systems enhancements.

• **Data Communication Specialist**—Candidates must have 2 to 3 years experience working with COMTEN Front End or equivalent processors, a working knowledge of OSVS, JES2, BTAM, RTAM, and TCAM, and the capability of programming in Assembler languages.

Our operating environment consists of a 3033, dual 370/168 and a 138 running MVS/JES2, interfacing with TSO, IMS, S2K, COMTEN and other 370's (155's, 145's and 138's). The individuals we are currently seeking should have experience in one or more of the following disciplines:

- **Prime Language**
 - COBOL
 - Assembler
 - MVS
- **Telecommunications**
 - TCAM
 - RTAM
 - BTAM
 - VTAM
- **Data Base Management**
 - IMS Preference
 - System 2000
 - IDMS
 - CICS

We offer an excellent fringe benefit package, including pension, performance sharing plan, major medical, vacation and holidays.

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Please send your resume, indicating geographical preference and the position you are interested in to: William H. Dalton, Martin Marietta Data Systems, P.O. Box 5837-MP357, Orlando, Florida 32855. We are an equal opportunity employer, m/f.

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- Data Base Administrators

The positions all are working with state-of-the-art hardware and software. They offer 18 to 24 month contracts for Tehran. Fee Paid.

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(212) 661-0670 (agency)

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The prime mission of Sperry Univac's Technical Services Division is to provide solid and responsive support to computer systems users.

Systems design, applications analysis, programming, and operations; Technical Services does it all — backed by Sperry Univac, a world leader in the design, manufacture, and application of state-of-the-art computer systems.

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- ASW
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Requirements for these positions are:

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- Real Time Assembly language
- Bachelor's Degree or equivalent experience

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(703) 558-4486

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Sr. Programming Analyst

Work on business applications for a hardware manufacturer. Requires six years of OS COBOL and business applications.

Salary to \$25,000

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Work in a corporate services group of this large California bank. Requires five years of OS COBOL plus an understanding of corporate banking functions.

Salary to \$29,000

Manager of Applications Support

Work in a small (1 man) group for now, in support of order processing for this hardware manufacturer. Requires strong IBM OS COBOL and assembly language in developing on-line systems.

Salary to \$29,000

IMS Systems Programmer

Work on development of new IMS internals software for this prestigious software company. Requires strong IMS DB/DC internals experience.

Salary to \$32,000

Product Marketing Manager

Work on product planning for this hardware manufacturer. Requires a technical background in hardware emulation, design and knowledge of applications in these areas.

Salary to \$35,000

Many other positions are available. Call COLLECT to schedule an appointment in San Francisco.

Call, Come in, or forward your resume to:
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Requires 2-4 years current experience with OS Assembler language. Excellent salary + benefits + challenging esprit de corps!

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We are seeking an individual who has worked on an IBM System 3 or Honeywell Level 62 computer system. Must have RPG II and Cobol experience. Experience in a retail or Home Center environment plus courses in computer science or business related field desirable but not required. Send resume to:

Personnel Manager
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Programmer

Systems Analyst/ Programmer

Excellent opportunity for financial systems analyst and COBOL programmer to work in 370 OS/VS1 environment. Both candidates should have worked with financial systems utilizing COBOL and structured programming techniques. Reply in confidence to W.L. Peterson, 550 California St., San Francisco, CA 94104. An equal opportunity employer.

Utah

International

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If you're in the kind of situation where other people are getting the credit for your hard work, maybe it's time you changed your situation. As a software specialist at Digital, you'd get all the credit you deserve. Because to us, software people are important and highly visible members of the customer support team.
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- Time-sharing business applications development
- Program conversion techniques
- User interface and need analysis

So if that's you, give us a call us at 800-526-3877 (in N.J. 800-352-4986) between 9:00 AM and 5:00 PM, May 30 to June 6. Or send your resume to: Digital Equipment Corporation, U.S. Rt. 1, CN-2, Princeton, New Jersey 08540, Attn: Mr. Lee Adrian. And find out why our customers aren't the only ones that get the best deal.

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Anchorage offers an area of unsurpassed beauty, wholesome, family-style living, excellent schools, and unlimited recreational opportunities. Live only 10 minutes from work! Leave the big-city hassles behind!

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Bank of Alaska

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PROGRAMMER ANALYST

All it takes is 2-3 years of programming experience in COBOL or ALC in a 370 environment to join a progressive data processing department of a life insurance company in Battle Creek, Michigan. Challenging opportunities exist within the following framework:

- MVS-370/168, DOS/VS-370/145
- Remote Processing/Data Transmission
- On-Line Test/Debug - TSO, VM, CMS
- On-Line Accounting Systems

Additional experience in any of the above, a plus. Interested?? Send your resume, including salary history and requirements to K.C. Brown, Federal Home Life Insurance Company, 78 West Michigan Avenue, Battle Creek, Michigan 49016
An Equal Opportunity Employer

Systems Programmers & Analysts

Electro-Optical Products, a Division of International Telephone and Telegraph Corporation, is seeking highly talented, self-motivated computer specialists to lead state-of-the-art projects involving:

- virtual machines (VM/370)
- data base systems (CICS/VS, DL/1)
- executive query languages
- text management systems

Selected candidates will have the opportunity to design and implement creative systems.

We offer an excellent starting salary, commensurate with education and experience, comprehensive benefits and generous relocation assistance.

Please forward detailed resume, including salary history in utmost confidence to: Mr. Danny Fisher, Manager, Recruiting, ITT Electro-Optical Products Division, P.O. Box 7065, Roanoke, Virginia 24019.

ITT**Electro-Optical
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When you join WANG you'll find that your career will take giant steps ahead. State-of-the-art is created here at WANG on a daily basis keeping us in the forefront of the word processing, computer and telecommunications industries. You will be encouraged to stretch your talents and to grow professionally in a vibrant, fast-paced atmosphere. Take the first step - consider the positions below!

Field Service Instructor

Qualifications:

- 2 years experience as Technical Instructor
- 2 years field service experience in support of minicomputer systems

Responsibilities:

- Curriculum development
- Structure and conduct field service training classes in support of microprocessor controlled, disk-based systems.

Senior Customer Training Specialist — Computer Systems

A career opportunity exists for a person who enjoys the challenge of educating customers and internal marketing people on the utilization of computer hardware and operating system features. You will have the opportunity to be creative and apply your knowledge in the development of new courses as well as modification of existing programs. This position requires a person:

- Who is creative and self-starting.
- Who has at least 3 years experience in the following areas:
 - Instructional experience in hardware and/or Operating Systems to Customers. Prefer Virtual Storage Systems.
 - Knowledge of interactive and time sharing systems
 - Field Experience as a Systems Analyst/Programmer with applications knowledge
 - Excellent programming experience in RPG II and COBOL.
- Who has excellent communications skills.

If you have the experience and are interested in this growth position, we want to speak with you.

Software Technical Writers

WANG is looking for software technical writers to document our new state-of-the-art 2200VS computer system. We need people with the technical ability to understand the various facets of a modern computer system and the writing ability to explain them clearly and coherently to others. We offer plenty of growth potential and the opportunity to work in a creative, challenging environment where individual achievement is recognized and rewarded. Our requirements are:

- Knowledge of at least one high level language, preferably COBOL, BASIC, or RPG II. (Knowledge of an Assembler language would be a plus.)
- Familiarity with a major computer operating system
- 1-3 years experience documenting or working with system software (programmers with a flair for writing are invited to apply).
- The initiative and creativity to follow a project through from initial research to final copy.

If you meet these requirements, we'd like to talk with you.

Excellent salaries and earning potential plus superior company benefits. Please send resume including academic background and salary history and requirements to:

Linda G. O'Connor
Career Opportunities
(617) 851-4111

WANG

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One Industrial Avenue
Lowell, Massachusetts 01851

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affirmative action employer.

Richmond, Va. OS Programmer-Analyst

Expanding organization converting from DOS to OS offers career opportunity requiring experience in operations on 370/145 or larger CPU with teleprocessing, remote job entry, 3330-disk, diskette units and VSAM file management, at least 5 years in assembler language and operating software (OS/VS1, DOS/VS, DL-1, IMS, CICS/VS, DMS/VS) as well as systems installation, application standards, systems design, and some ANS COBOL. We are seeking proven managerial ability to accept a challenge with outstanding growth potential. You will like our benefits and pleasant working conditions in our new headquarters building in a convenient suburban area of gracious southern city. Please send resume including salary history and requirements in confidence to:

Director of Personnel
Southern States
Cooperative
P.O. Box 26234
Richmond, VA 23260

RAYTHEON PTS1200 PROGRAMMER/ ANALYST

Progressive industry specialized national data processing service company pursuing leading edge technology in distributed processing is seeking a talented professional for their PTS1200 document preparation project. Company enjoys a highly profitable exceptional growth rate. Require extensive Raytheon PTS1200 experience. Computer science degree highly desirable. SVS/MVS, HASP, CICS, RJE experience a definite plus. Exciting opportunity with an exceptional company, little travel, attractive low cost sunbelt city, profit sharing, ESOP/TRASOP plans. CW Box 1579, 797 Washington St., Newton, MA. 02160.

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Marketing Representative

Computer Optics, Inc., a leading manufacturer of display terminal systems, is expanding its marketing force throughout the United States. The ideal candidate should have a minimum of three to five years experience selling computer peripherals (or mainframes) and be currently producing above average results.

Compensation package will exceed \$40,000 for over-quota performance. Some management experience will be an asset, because we will be looking to promote from within.

Our Vice President of Marketing, Mr. Frederick H. Sweeny will be interviewing at the National Computer Conference, Anaheim, California, June 5th through June 9th. Please call him at 800-243-1314 to arrange an interview at NCC. If you are unable to meet with him there, please submit your resume, in confidence, to his attention. He will be interviewing in major cities during the month of June.

Please call:

800-243-1314



Computer Optics Inc.
Berkshire Industrial Park, Bethel, CT 06801

Northwest and Alaska

DATA PROCESSING

Whether seeking the right job or changing jobs, you are faced with a difficult and crucial decision in career growth. Houser, Martin, Morris and Associates, the leading Northwest data processing placement specialist, are interested in finding you the right opportunity-position, company, and location - to enhance your professional and personal growth. If you are interested in Northwest or Alaska D.P. opportunities we can help you look at (or for) the best available positions fitting your background and desires. A sampling of presently available positions includes:

S & P Manager: Financial institution, staff of 25, IBM 370 environment.

DP Consulting: Excellent written and oral skills, strong accounting and technical DP background, MCS group of national accounting firm.

Systems Programmer: OS MVS internals, BAL.

Programmer/Analyst: Banking, insurance, distribution, COBOL, BAL and/or RPG, IBM 360/370.

Senior Process Control Supervisor: PDP 11 or Xerox systems experience.

Don't settle for less its your career. Write Houser, Martin, Morris and Associates to confidentiality discuss and search for your right Northwest opportunity.



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We've started with an intelligent typewriter (Qyx, the world's first electronic typewriter) and we intend to go on from there. We're looking far into the future. If you're one of the few pathfinders who can help take us where we're going...we have more to offer you than any other company.

Our intention is to bring the most advanced, sophisticated, **useful** capabilities to even the smallest offices—at the smallest prices. For example, our Qyx typewriter right now can incorporate modules to make it a memory typewriter, a mini-diskette text editor, a communicating typewriter, and a display typewriter. The capabilities we next build into it depend, to a large degree, on **you**, and what you contribute.

What we offer in exchange begins with an aggressively competitive salary...and it goes on to include: High growth potential...a final product as visible as the office typewriter...several career paths, technical and managerial...and a complete schedule of benefits.

We want experienced people, familiar with: Hard/Soft Copy Input Text Editing ■ Displays ■ Operating Systems ■ Computer-Aided Instruction ■ Diagnostic Software ■ Communications. A BS or MS degree in Electrical Engineering or Computer Science, or the equivalent, is required.

If you qualify, please apply by sending your resume, with salary history, to: Mr. G. Mathern, Qyx, Division of Exxon Enterprises, Inc., PO Box 429, Exton, Pa. 19341. We're located in a highly attractive area near Philadelphia. Local interviews can be arranged.

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DIAGNOSTIC PROGRAMMER

★ Los Angeles ★

THE COMPANY

Computer Communications, Inc., a Southern California based corporation and leader in state-of-the-art data processing.

THE POSITION

Diagnostic Programmer to develop and maintain diagnostic programs for field support and repair module test functions. Individual will also be responsible for providing necessary documentation and assistance.

THE CANDIDATE

Career-oriented individual with a minimum of 2 years experience in digital logic or systems software in mini- or micro-assembly language. Candidate should have diagnostic programming experience and BSEE or BSCE; data communications experience would be a plus.

THE CONTACT

For immediate consideration contact our National Recruiter by calling collect or sending resume in confidence:

Anthony Hattenback
(213) 274-5328
9701 Wilshire Blvd., Suite 805
Beverly Hills, CA 90212
Equal Opportunity Employer M/F

programming

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The people who made a meaningful impact on the computer business need people who need something meaningful in their work.

In 1970, when we set out to design a new generation of large computers, the spirit of our small group was intense.

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Because we're still concerned with the future. Setting new goals and challenges regularly.

Our success is based on people with energy and ideas. And now, we need more people with the same trailblazing spirit to help us write another chapter of our unique story. Drop in and talk with us. We hope we'll be able to begin a working relationship that's meaningful to both of us.

Qualified candidates are invited to direct their response to Employment Department, Amdahl Corporation, P.O. Box 5070, Sunnyvale, CA 94086. We are an equal opportunity employer.

DIAGNOSTICS SOFTWARE ENGINEERS

Amdahl is committed to state-of-the-art in diagnostics and is currently seeking Diagnostics Software Engineers at all levels. You will design, develop and maintain diagnostic system software for our large-scale computers. You should have knowledge of logic design and large computers, experience in high level language programming and the ability to work with large and mini systems. Please indicate 435-E on your response.

DESIGN AUTOMATION MANAGER

We are seeking first level managers to join the DA development team involved in an advanced product design effort. Successful candidates will manage various aspects of a new integrated computer-aided design system including language design, data base management, simulation, physical packaging and graphics. You have managerial experience on large engineering software projects and the desire to organize a team involved in quality software systems. Please indicate 4272-E on your response.

SOFTWARE DEVELOPMENT LANGUAGE TOOLS MANAGER

You will be managing one of several software development organizations that support the design, development and marketing of our products. You are experienced in managing software development and will be involved in the application of language tools to the software development process. You must be knowledgeable in state-of-the-art software engineering developments and, ideally, have experience in systems programming and compilers. Please indicate 437-E on your response.

ENGINEERING SOFTWARE INTEGRATION MANAGER

You will be responsible for providing in-process QA for specifications and code, implementing final test/regression testing procedures, and coordinating the release of software, including diagnostic and small systems control programs, to users. You have technical management experience in a large software project and will find it helpful to have hardware experience. Please indicate 4273-E on your response.

DESIGN AUTOMATION ENGINEER

We seek Software Engineers with experience in developing large software systems as part of a hardware development effort. Opportunities are available in data base, automatic test generation, graphics, design analysis, physical design, routing and placement. You should have applicable experience and interest in developing ideas as part of a team. Please indicate 4271-E on your response.

SMALL COMPUTER SYSTEMS PROGRAMMING MANAGER

You will be responsible for writing control programs for small computers that function as master controllers for Amdahl's CPUs and special test equipment. Your background should include machine and higher level languages, system software/control programs experience, and technical management experience in a large software project. Please indicate 4274-E on your response.

CPU DIAGNOSTICS DEVELOPMENT MANAGER

Your department will specify, review and implement diagnostics for Amdahl's large CPUs. You will use Amdahl's unique diagnostic hardware and will operate in the environment provided by Amdahl's advanced diagnostics systems. Your background includes knowledge of large system hardware and technical management experience in a large software project. Please indicate 4275-E on your response.

PROGRAMMING ASSISTANT

We have an immediate need for an individual who will assist software programmers in the development of minicomputer systems. Your responsibilities will include performing program assemblies, compilations and system generations on a minicomputer system. You should have at least a high school education and 2-3 years' experience in operating computer systems. You will find it helpful to have experience with TSO, JCL, and NOVA minicomputer operation. Please indicate 4276-E on your response.

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We're looking for individuals involved in realtime command and control, data base, test and integration, signal processing, communications, or text processing, with experience in one or more of the following: PDP 11, NOVA, ROLM, UYK 7 & 20, HP, INTEL 8080 and Z-80 with knowledge of FORTRAN, ASSEMBLY, PASCAL, or CMS-2. Requires BS in Computer Science, EE, Math, or equivalent experience, master's degree desirable.

Digital Design Engineers

Successful individuals will have background in distributed microprocessor, architecture, realtime software, digital processor, and digital bus interfaces. Should possess good experience in signal processing and signal analysis, and computer system design.

ATTENDING THE NCC SHOW JUNE 5-8? QUALIFIED INDIVIDUALS ARE INVITED TO MAKE RESERVATIONS FOR A FREE BAY CRUISE DURING THE SHOW (JUNE 5-8). DON'T LET YOUR CAREER BECOME "ANCHORED" BY A SLOW-MOVING COMPANY. JOIN THE GTE SYLVANIA EXCURSION.

Interested and qualified individuals should call collect (415) 966-2995, 8AM-5PM PDT, weekdays. If unable to call, please forward your resume, including salary history and requirements to Dept. CW-585, GTE Sylvania, P.O. Box 188, Mountain View, California 94042. An equal opportunity employer, minorities and females encouraged to apply. U.S. citizenship required.

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The Great Technological Environment

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Wells Fargo Mortgage Company has an immediate opening for an experienced Computer Operations Manager at its servicing center in SANTA ROSA, CA.

The individual chosen must have the technical expertise to manage an IBM 370/125 DCS/VS installation as well as previous supervisory experience. Ability to communicate well with technicians and managers of all levels is essential. Distributed Data Processing background would be helpful.

Salary and Benefits competitive. Please submit Resume including salary requirements to:

Personnel Department
Wells Fargo Mortgage Co.
1701 4th St.
P.O. Box 937
Santa Rosa, Ca. 95402

ASSISTANT PROFESSOR Computer Science

The Mathematical Sciences Department of Florida International University has an opening for an Assistant Professor, starting in September, 1978. This position may be either a visiting or permanent continuing faculty member. Applicants should have their Ph.D. degree by Fall, 1978, (for permanent position) and should have demonstrated teaching ability. Duties include teaching of advanced undergraduates and research. Of particular interest are the areas of compiler construction, programming languages, operating systems, and computer organization. Salary is competitive. Please send resume and the names of three references to:

Dr. Samuel S. Shapiro, Chairman
Dept. of Mathematical Sciences
Florida International Univ.
Tami Trail
Miami, FL 33199
Florida International University is an Equal Opportunity/Affirmative Action Employer.

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MCI Telecommunications Corporation is a specialized common carrier offering a variety of communications services to business and industry. We have immediately available, in our Washington, D.C. corporate headquarters, openings for a Manager and Programmers to develop and enhance several billing systems.

MCI's computer facilities include an IBM 360/65 under OS/MVT with HASP, and a multi-terminal Datapoint 6600. The company plans to upgrade its IBM facilities shortly.

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This manager will lead the activities of analysts and programmers in developing, enhancing and maintaining accounting, inventory control, material management and order entry systems for MCI's communications service.

The successful candidate should have at least seven years progressively responsible experience in the analysis and programming (COBOL) of financial and billing systems for a utility or service-oriented industry (i.e. insurance, distribution, brokerage, etc.). At least two years should be at a supervisory or project leader level.

PROGRAMMER/ANALYSTS

Openings exist at the intermediate level for persons having at least two years of COBOL programming in an IBM 360/370 commercial environment. They should be capable of being part of a team effort and work with a minimum of direct supervision. Positions require frequent user contact, and the ability to participate in several projects simultaneously. All programming is done via interactive low speed terminal connected to the 360/65. Most applications utilize nationwide distributed processing techniques.

MCI offers challenging and pleasant working conditions with excellent opportunities for advancement. Salaries and benefits are competitive and include an employee stock purchase plan. Interested applicants are requested to submit resumes to: PERSONNEL DEPARTMENT

MCI TELECOMMUNICATIONS CORPORATION

1150 17th Street, N.W.
Washington, D.C. 20036

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Programmer Analyst/ Instructor

A unique opportunity exists for an experienced innovative and seasoned Programmer Analyst who would like to teach as well as work in an environment conducive to professional growth and development.

Responsibilities involved in this position include directing training and evaluating programming personnel in the effective design of computer business application programs.

The successful candidate will spend seventy percent of their time as an instructor and approximately thirty percent in a production work environment.

Position requires at least two years' experience as a programmer/analyst with three to four years' business applications exposure and the ability to instruct programming personnel.

Tektronix, Inc. develops, manufactures and markets internationally recognized precision electronic measurement instruments, computer peripherals and related electronic instrumentation. Located near Portland, Oregon we are within a two hour drive of the Cascade Mountains and Ocean Beaches. The close-by natural playgrounds and the City of Portland provide a variety of recreational and cultural interests.

Salary is open. Benefits include educational support, insurance and profit sharing programs.

Send detailed resume and salary history to Larry Green, TEKTRONIX, INC., P.O. Box 500, 161, Beaverton, Oregon 97077.

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Tektronix

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Marietta College Computer Center Entry Level Analyst-Programmer

This position will develop into the primary interface between the Computer Center and various College administrative offices, assisting in the design and development of new applications, and training non-technical personnel in the use of these systems. Excellent verbal and writing skills and demonstrable proficiency in FORTRAN required. Prior 360/370 assembler and/or DBMS experience highly desirable. Excellent employee benefits are provided, with salary around \$1,200 per month. Write to: Roy Williams, Director of Data Processing, Marietta College, Marietta Ohio 45750. An affirmative action, equal opportunity employer.

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Software: DOS \$23K
Software: OS \$25K
Proj. Leader \$27K

Several positions open in the above categories with leading Southeastern companies. Mail confidential resume or call Joe Sawyer, the EDP Personnel Specialist, (803) 233-2546.

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1421 Laurens Rd., Suite 200A
Greenville, S.C. 29607

DATA PROCESSING PROFESSIONALS

The Medical College of Wisconsin and Froedtert Memorial Lutheran Hospital are establishing the joint Medical Computer Center in the College's new facility in suburban Milwaukee to support the patient care, teaching and research missions of health care delivery institutions and all missions of the Medical College. The center has been designed to the highest level criteria for reliability, low response time, and comprehensive on-line support to all functional components of its users. The on-line data base driven software will run on a completely multiplexed hardware configuration established in a first class environment and supported by an uninterruptable power source. Remote terminal devices will be similarly supported by uninterruptable power sources at each user's installation. Present staffing requirements are identified below. Growth is assured.

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CONVERSION SUPERVISOR

Bachelor's degree in Computer Science, related field or equivalent experience. Must have been lead in prior computer conversion. Ideally conversion would have been to Burroughs large systems. DMS-II, GEMCOS knowledge desired. This is a permanent position for a supervisor in the Systems and Programming area.

DATA BASE ANALYST

Bachelor's degree in Computer Science, related field or equivalent experience with one-two years in application system design and analysis. Two years experience in data base technology.

MEDICAL COLLEGE OF WISCONSIN

Computer Center
1725 West Wisconsin Avenue
Milwaukee Wisconsin 53233

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SENIOR SYSTEMS ANALYSTS

Bachelor's degree or equivalent experience with 3 to 4 years experience as a systems analyst DMS-II experience; hospital and or educational applications background a plus.

SYSTEMS PROGRAMMER

Bachelor's degree or equivalent experience with 2 to 4 years in systems programming; at least one year in B6700-B6800 systems support programming desired.

ANALYST/PROGRAMMERS

Bachelor's degree or equivalent experience; two years as programmer/analyst; experience with COBOL required. DMS-II experience desired.

The Medical College of Wisconsin, a private institution, offers an exceptional salary and benefits package. If unable to call, please send a letter or resume in complete confidence.

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Fine career opportunities for security and surveillance software product development. Public company with international headquarters in Coral Gables, Florida.

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Lead technical responsibility for detailed design, coding, integration, checkout and documentation of software packages for industrial access control and alarm monitoring. Three to five years mini-computer real-time operating system and assembly language programming experience is desirable.

SENIOR PROGRAMMER

Mini/Micro computer assembly language programmer with heavy debugging and troubleshooting background. Experience with I/O handlers for Nova 3 equipment preferred. Responsible for development, checkout and documentation of customized software for real-time access control and intrusion detection systems.

Send Resume and Salary History to:

MR. JOHN A. HAVERFIELD
THE WACKENHUT CORPORATION
3280 PONCE DE LEON BLVD.
CORAL GABLES FLA. 33134

PROGRAMMERS Montvale, N.J.

Two or more year's experience in ANSI-COBOL applications programming will open the door to an exciting, unusual career opportunity at InSci. You will need experience on the IBM 360/370, under OS. A BA/BS degree would be helpful.

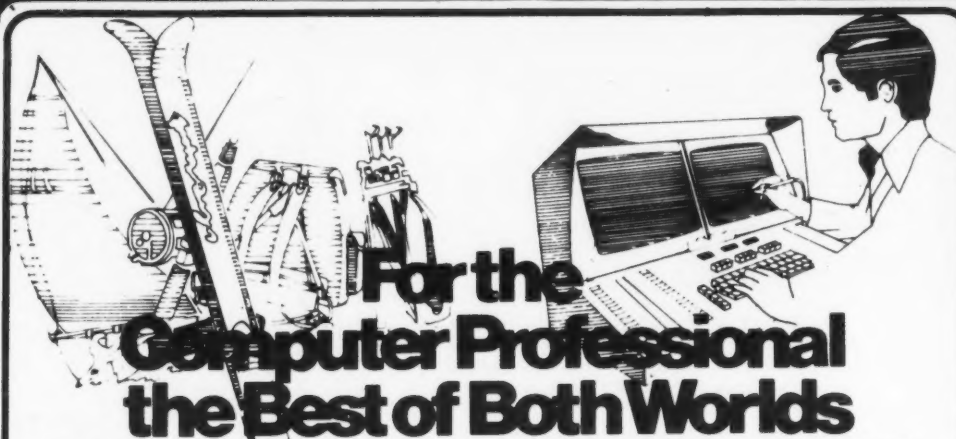
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Please send us your resume or a letter outlining your experience. Be sure to include your salary history.

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InSci



Outstanding opportunities with Sperry Univac - at our rapidly expanding General Systems Division in Salt Lake City where we're dedicated to the development needs for communications, terminals, and small business systems.

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Design of digital and analog circuits or RF design.

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Experience in process development and control for high volume production. Emphasis in printed circuit board fabrication.

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Employment Department
Sperry Univac
322 North 2200 West
Salt Lake City, Utah 84116

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Operations Analysis

- Budgeting
- Cost Analysis
- Planning

Manager, Operations Analysis

The responsibilities for this position require an innovative, creative manager to manage Operations Analysis within the Business Analysis unit for our Test and Measurement group. Position includes responsibility for the design and preparation of meaningful financial analysis as needed for management to improve decision making processes; and to coordinate Test and Measurement Group financial data for all submissions dealing with the fiscal plan.

The successful candidate will have five years' related work experience, knowledge of analytical techniques and management theory, proven ability to clearly present financial data in an concise and useful manner, working knowledge of budgeting and planning processes and excellent communication skills.

A bachelors degree, MBA desirable, in business with emphasis in accounting or finance or equivalent professional. User knowledge of EDP is desirable.

Engineering Operations Analyst

Opportunities exist for a person on the group level who will be oriented toward solving systems problems and coordination information flow and planning.

In Engineering Operations Analysis the person we seek will have a minimum of three years' experience in accounting and financial analysis, preferably in an engineering environment. This person will function as the Division Financial Analyst for Test and Measurement group's engineering support activities.

Tektronix, Inc., develops, manufactures and markets internationally recognized precision electronic measurement instruments, computer peripherals and related electronic instrumentation. Located near Portland, Oregon we are within a two hour drive of the Cascade Mountains and Ocean Beaches. The close-by natural playgrounds and the City of Portland provide a variety of recreational and cultural interests.

Salary is open. Benefits include educational support, insurance and profit sharing programs.

Send detailed resume and salary history to Larry Green, TEKTRONIX INC., P.O. Box 500, Q62, Beaverton, Oregon 97077.

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111 Pearl St.
Hartford, Conn. 06103
(203) 278-7170

SCIENTIFIC & SYSTEMS PROGRAMMER (Raytheon RDS 500)

for the Social Science Research Institute, U of Maine at Orono, staff at Pittsfield facility of the Maine Department of Transportation, to take charge of real-time data system to determine rural highway driver behavior. Need Assembler & FORTRAN exp. (RDS 500 preferred); ability to translate experimental design specs into working systems of real-time data collection & analysis programs, utilities, & system software. \$14-16K for 1 yr appointment (renewal likely). Resume & letter to: SSR1, 164 College Av, Orono, ME 04473. The U of Maine is an Equal Opportunity Employer.

SYSTEMS ANALYSTS • PROGRAMMER ANALYSTS

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We are GTE Data Services...with 14 data centers throughout the U.S.A. and corporate headquarters located in Tampa, Florida.

★ SYSTEMS ANALYSTS

Five years or more experience with IBM and/or Honeywell background in systems design and implementation. Our corporate languages are COBOL and FORTRAN. We are looking for the professional analysts who can design and provide specifications for all major business applications. Skills in TSO, HIPO and structured programming, CICS and IMS very desirable. We also need analysts for our time sharing environment with experience on Honeywell systems especially IDS2. Degree desirable.

★ PROGRAMMER ANALYSTS

Candidates must have very good working knowledge of IBM or Honeywell COBOL and/or FORTRAN. IBM experience in an MVS environment with a good working knowledge of JCL, Utilities, Syncsort. Honeywell experience for GCOS system. Degree also desirable.

We will be in the following cities to talk to interested candidates:

CITY	DATE	LOCATION	PHONE
MIAMI, FLA.	JUNE 5	Holiday Inn 112th St. Biscayne Blvd.	305/893-4110
JACKSONVILLE, FLA.	JUNE 6	Holiday Inn 555 Stockton St.	904/387-4661
ATLANTA	JUNE 8	Holiday Inn I-75 N. NW Expressway Howell Mill Ext.	404/351-3831
CHICAGO	JUNE 9 & 10	Holiday Inn 1 Mid-City Plaza	312/829-5000
DALLAS	JUNE 12	Holiday Inn I-35 & 1955 N. Industrial Blvd.	214/747-9551
HOUSTON	JUNE 14 & 15	Holiday Inn 2100 Memorial Drive	713/869-8261

Please forward a resume or call 1-800-237-2774 or 5 or 6 to arrange for a personal interview or contact N. Fitzpatrick or J. Muth at the above numbers when we are in your city.

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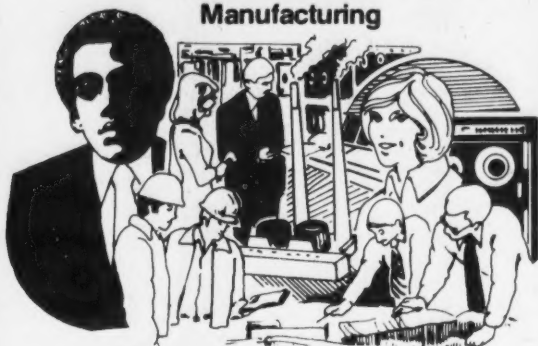
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Division of Sperry Rand Corporation

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Positions are available for the individual with proven management experience in Data Processing.

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Extensive data processing experience in health care claims processing or heavy file design with large complex data structures. Team responsibilities for structured walk throughs, testing, and systems analysis.

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Working in health administration and claims processing, you'll be involved in support systems design for health care; on-site customer support at management levels; and interface with OSI's technical staff. Required is a degree in Computer Science or equivalent experience, including 3 years' in programming and 3 years' as an analyst, with heavy COBOL and IBM 360/370 experience. Health care experience is desirable.

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Several opportunities are available here involving many diverse activities, some of which include designing and coding structured COBOL programs, walk-throughs, testing and systems analysis, and other duties related to health care/claims processing. We have openings for the following experience levels:

- B.A. or B.S. degree, with a minimum of 2 years' ANS-COBOL using an IBM/OS system, or 2 years' large scale IBM/OS or VS experience.
- B.A. or B.S. degree, plus 3-5 years' data processing experience, including COBOL, (ANS), IBM/OS, utilities, CFMS, CICS.

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We have many opportunities in this area, most of which involve the analysis and design of large, complex data files with multiple entrypoints, all within the health care field. B.A. or B.S. in math, engineering or science is required including the following specific duties:

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You'll develop and implement an optimum work flow system and assist in staffing all levels of personnel for health care clients. You must be familiar with work flow systems and procedures and man-motion studies. An Industrial Engineering degree is required and a background in health insurance claims processing/clerical functions preferred.

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You'll provide customer support in the area, converting and installing systems on the OSI large scale IBM computers. Required is a B.A. or B.S. and 5 years related experience in systems analysis with MVS and interest in a Marketing environment.

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Optimum Systems Incorporated

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SALARY: \$16,000*

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In addition, you will be responsible for providing services to other EDP groups and outside organizations within the company on operating systems features and proper job control language.

You will be responsible for the efficient usage of these features and the initiation of corrective action for

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Applicants must have experience in telecommunications (TCAM, VTAM, NCP/3705), teleprocessing, performance measurement and evaluation and IMS Sys. Gens. (D.B. required, D.C. preferred).

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Install and maintain operating systems and software packages for administrative data processing. Experience with IBM's S/VS and MVS operating systems, JES2, system generators, utilities and CICS. Progressively responsible experience in systems software as programmer and programmer analyst, with minimum two years assembly programming. Bachelor's degree or equivalent education and experience necessary. Salary range \$14,050 - \$19,670. Apply before June 10, 1978 to: Personnel Office, 110 Nisbet Bldg., Michigan State University, East Lansing, MI 48824. An Equal Opportunity Employer.

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CDC 6400

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an open letter to sales representatives, systems analysts... who want the most for their efforts

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Take a look at how fast some of our divisions have grown in the past year, and you'll see why.

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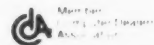
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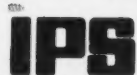
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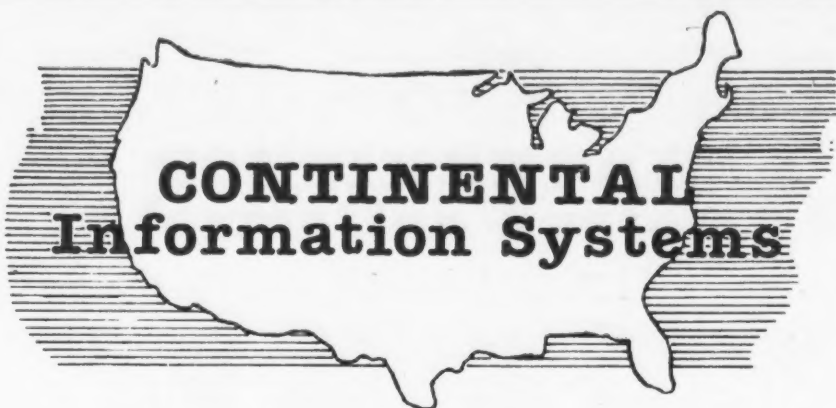
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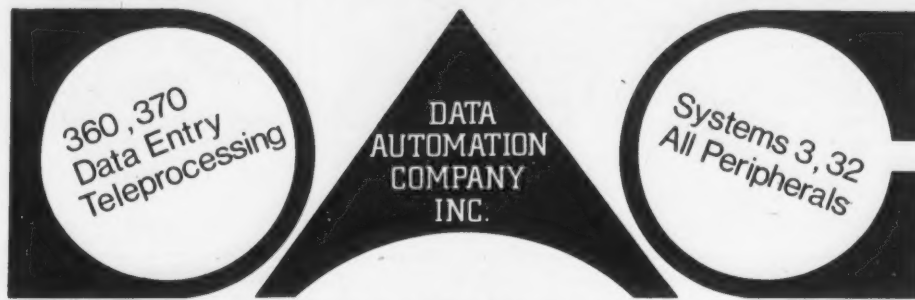
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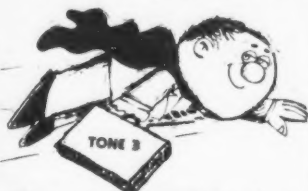
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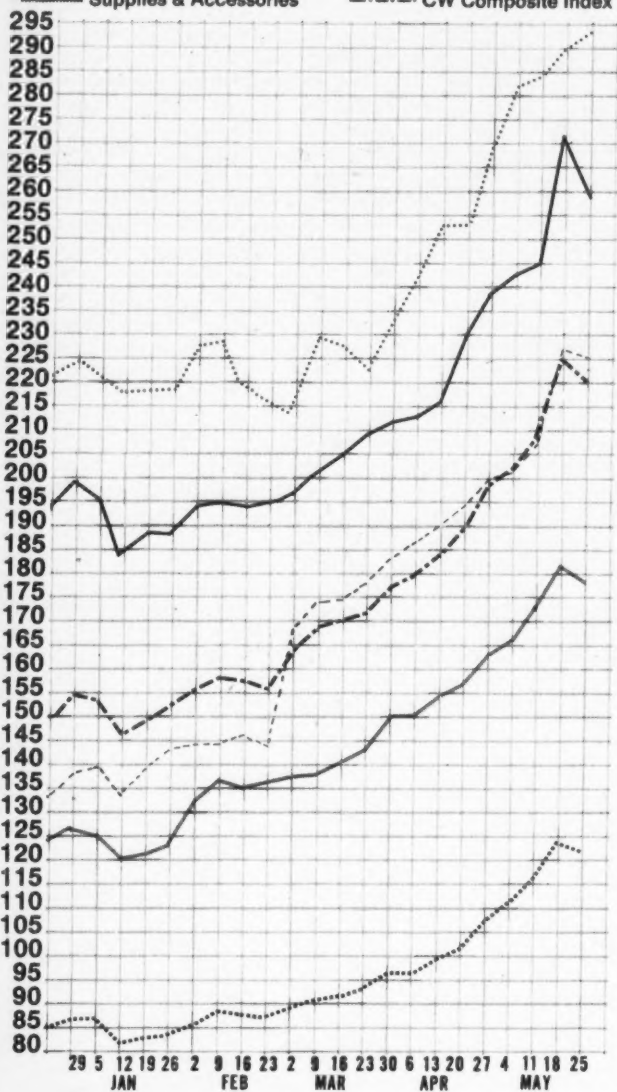
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Earnings Reports

NUCLEAR DATA

Year Ended Feb. 28

	1978	1977
Shr Ernd	\$1.13	\$1.89
Revenue	22,847,490	18,474,653
Tax Cred	400,000	400,000
Earnings	1,089,220	1,614,067
3 Mo Shr	.15	.66
Revenue	6,192,000	5,053,199
Earnings	144,781	606,517

a-Restated

SPERRY RAND

Year Ended March 31

	1978	1977
Shr Ernd	\$4.60	\$4.11
Revenue	3,649,487	3,270,008
Earnings	176,619	156,826
3 Mo Shr	1.53	1.25
Revenue	1,071,175	897,096
Earnings	59,583	47,811

SYSCO

Three Months Ended April 1

	1978	1977
Shr Ernd	\$7.75	\$5.88
Revenue	212,463,000	182,036,000
Earnings	2,529,000	2,292,000
9 Mo Shr	2.29	1.82
Revenue	603,211,000	511,372,000
Earnings	7,727,000	6,147,000

TELECOM

Three Months Ended March 31

	1978	1977
Shr Ernd	\$0.09	\$0.34
Revenue	27,365,000	22,131,000
Earnings	171,000	622,000

TERMINAL DATA

Three Months Ended March 31

	1978	1977
Shr Ernd	\$1.18	\$5.10
Revenue	2,298,000	1,745,300
Earnings	143,900	78,200
6 Mo Shr	.30	a.28
Revenue	4,224,000	3,545,700
Spec Cred	21,500	21,500
Earnings	236,800	218,500

a-Adjusted for a 10% stock dividend paid in February 1978.

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TRADE QUOTES

Computerworld Stock Trading Summary

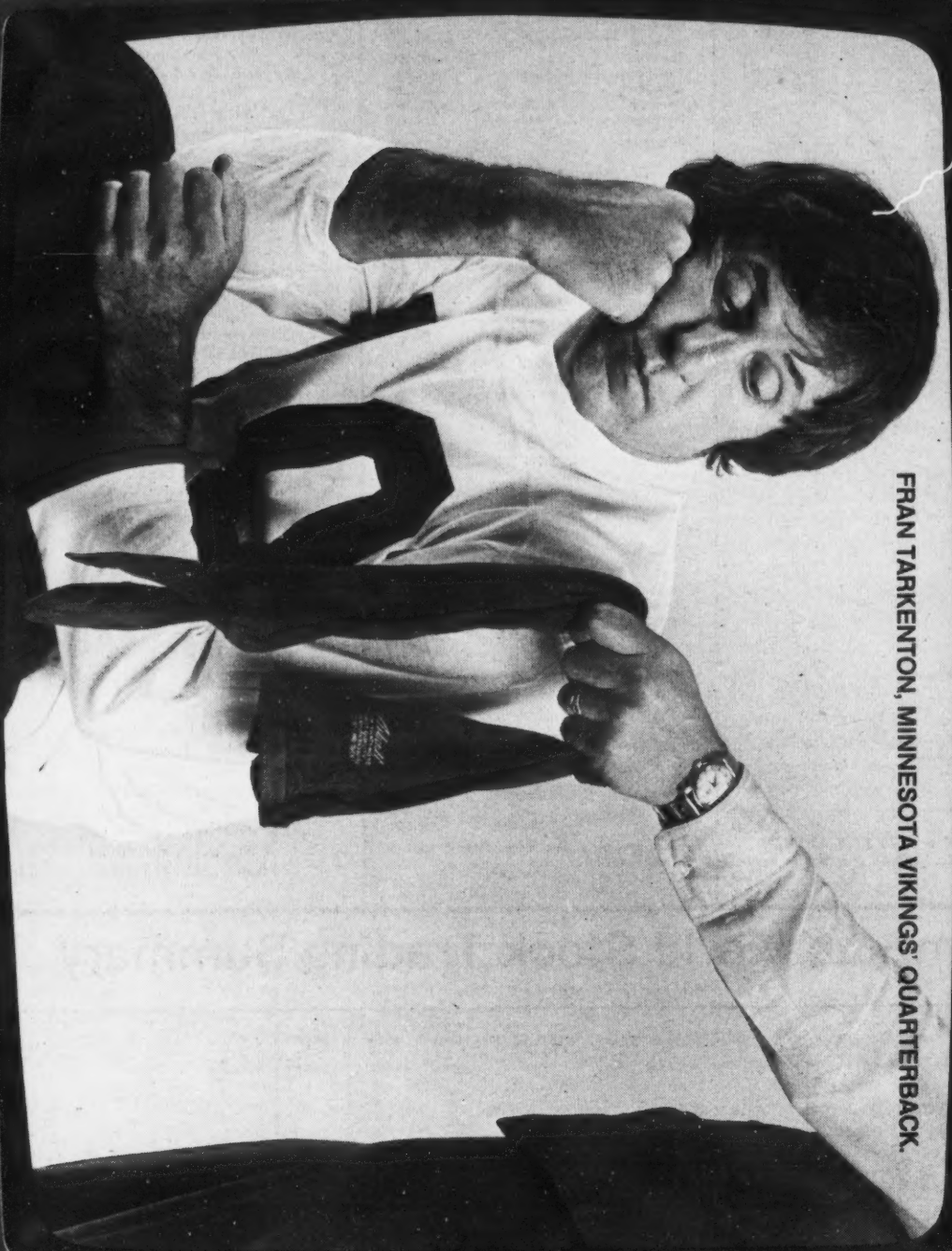
CLOSING PRICES WEDNESDAY, MAY 24, 1978

All statistics compiled,
computed and formatted
by
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Cambridge, Mass. 02139

X C H	PRICE				X C H	PRICE				F X C H	PRICE			
	1977-78 RANGE (1)	CLOSE MAY 24 1978	WEEK NET CHNGE	WEEK PCT CHNGE		1977-78 RANGE (1)	CLOSE MAY 24 1978	WEEK NET CHNGE	WEEK PCT CHNGE		1977-78 RANGE (1)	CLOSE MAY 24 1978	WEEK NET CHNGE	WEEK PCT CHNGE
COMPUTER SYSTEMS														
A ANDAHL CORP	22-34	32 1/2	-1 5/8	-4.7	C ADVANCED COMP TECH	0-2	1 3/8	+1/4	+22.2	D DATA ACCESS SYSTEMS	4-5	4 1/4	-1/4	-5.5
N BURPCUGHS CORP	55-91	71 7/8	-1 3/4	-2.3	D ANACOMP INC	7-14	13 1/2	-3/8	-2.7	D DATA 100	6-17	16 1/8	-5/8	-3.7
C COMPUTER AUTOMATION	18-36	35	+1/2	+1.4	A APPLIED DATA RES.	5-14	12 3/4	-3/4	-5.5	A DATA PRODUCTS CORP	9-20	18 3/4	-1/4	-1.3
N CONTROL DATA CORP	20-33	31 1/2	-1	-3.0	N AUTOMATIC DATA PROC	23-31	30 3/4	-1/2	-1.5	D DATA TECHNOLOGY	3-4	4 1/4	0	0.0
C CRAY RESEARCH INC	15-46	42 3/4	-3	-6.5	C COLEMAN AMERICAN COS	1-2	1 1/2	0	0.0	D DATUM INC	1-4	4 1/8	+1/8	+3.1
N DATA GENERAL CORP	35-59	55 3/8	-3 1/8	-5.3	D COMPU-SERV NETWORK	7-15	10 1/2	-1/2	-4.5	D DECISION DATA COMPUT	2-3	2 7/8	+1/8	+4.5
N DATAPoint CORP	18-56	52 3/8	-1 3/8	-2.5	D COMP ELECTION SYSTEMS	6-10	9	0	0.0	D DELTA DATA SYSTEMS	1-1	3/8	0	0.0
N DIGITAL EQUIPMENT	37-53	47 3/4	-1 1/2	-3.0	C COMPUTER HORIZONS	1-2	3	+3/4	+33.3	A OCCUPATION INC	6-20	19 3/4	+7/8	+4.6
N ELECTRONIC ASSOC.	2-8	7 1/4	-1/2	-6.4	D COMPUTER NETWORK	6-11	9 7/8	-1/8	-1.2	D DATAPAM CORP	2-24	22	-2	-8.3
A ELECTRONIC ENGINEER.	8-17	16	-5/8	-3.7	N COMPUTER SCIENCES	7-12	11 1/4	-1/2	-4.2	N ELECTRONIC M & M	4-7	7 5/8	-5/8	-8.6
D FOUR-PHASE SYSTEMS	13-32	30 3/4	-1	-3.1	D COMPUTER TASK GROUP	1-2	3 1/2	+1/4	+7.6	D FABRI-TEK	1-2	1 1/4	-	-4.7
N FOXBORO	28-54	34 7/8	-1 1/4	-3.4	D COMPUTER USAGE	1-4	3 3/8	-1/8	-3.5	D GENERAL COMPUTER SYS	0-2	1 3/8	+3/8	+37.5
D GENERAL AUTOMATION	6-12	11	+1 1/4	+12.8	C COMSHARE	5-15	14	-1	-6.6	N HAZELTINE CORP	8-15	13 7/8	-1 1/8	-7.5
C GPI COMPUTER CORP	1-1	1 1/8	0	0.0	D DATA DIMENSIONS INC	3-5	4 3/8	-1/4	-5.4	N HARRIS CORP	28-58	53 1/4	-5 1/8	-8.7
N HEWLETT-PACKARD CO	62-87	79 1/4	-2 1/8	-2.6	D DATATAB	1-2	1 1/4	0	0.0	D INFOREX INC	4-9	8 7/8	-3/8	-4.0
N HONEYWELL INC	43-58	55 5/8	-2 1/2	-4.3	N ELECTRONIC DATA SYS.	14-23	20 3/8	-1 1/8	-5.2	D INFORMATION INTL INC	8-14	9 1/2	-1/4	-2.5
N IBM	236-286	262 1/2	-3 1/2	-1.3	D INSYTE CORP	2-3	1 1/8	0	0.0	D INTFL CORP	38-59	53 1/2	-4 1/2	-7.7
D MANAGEMENT ASSIST	5-18	17 1/8	-7/8	-4.8	D IPS COMPUTER MARKET	1-2	2 1/4	0	0.0	A LUNDY ELECTRONICS	3-6	3 1/4	0	0.0
C MICRODATA CORP	7-18	15 1/2	+1 1/4	+8.7	D KEANE ASSOCIATES	3-4	3 3/4	+1/8	+3.4	D MSI DATA CORP	6-19	17	-1 5/8	-8.7
D MINI-COMPUTER SYST	5-12	7 1/4	-3/4	-9.3	D KEYDATA CORP	1-3	2	-1/4	-11.1					
SOFTWARE & EDP SERVICES														
C MODULAR COMPUTER SYS	5-15	12 3/4	-1 3/4	-12.0	A LOGICON	7-17	13 3/8	-7/8	-6.1	N MEMOREX	23-47	46 1/4	-1	-2.1
N NCR	32-57	53 5/8	-2 7/8	-5.0	A MANAGEMENT DATA	1-2	1 1/4	+1/8	+11.1	N MOHAWK DATA SCI	5-12	10 7/8	-1 3/8	-11.2
D PRIMM COMPUTER INC	12-39	20 1/2	-18 5/8	-47.6	A NATIONAL CSS INC	10-26	24 1/2	-3/4	-2.9	C PENRIL CORP	2-9	8 5/8	-1/8	-1.4
N PERKIN-ELMER	17-23	21 7/8	-1 1/4	-5.4	D NATIONAL DATA CORP	4-12	10 3/4	-1 1/4	-10.4	N PEPTEC CORP	7-14	12 1/2	-1 1/8	-8.2
N RAYTHEON CO	16-47	43 3/4	-1 7/8	-4.1	A ON LINE SYSTEMS INC	16-25	22 7/8	-1 5/8	-6.6	A POTTER INSTRUMENT	2-2	1 3/4	0	0.0
N SPERRY RAND	30-44	42	-1 7/8	-4.2	N PLANNING RESEARCH	3-7	6 3/8	-5/8	-8.9	D PRECISION INST.	2-2	2	0	0.0
D SYCOR INC	8-24	24	+1/8	+0.5	D PROGRAMMING & SYS	1-1	7/8	-1/8	-12.5	D QUANTOR CORP	3-5	3 1/8	-1/4	-7.4
A SYSTEMS ENG. LABS	5-19	17 1/2	-1 1/8	-6.0	D RAPIDATA INC	2-5	5	+1/4	+5.2	D RECOGNITION EQUIP	6-13	8 5/8	-3/8	-4.1
A WANG LABS.	10-23	21 1/8	-1 7/8	-8.1	D REYNOLDS & REYNOLD	17-26	25 1/4	-3/4	-2.8	D SCAN DATA	1-4	2 1/2	-3/4	-24.0
LEASING COMPANIES														
D ALANTHUS CORP	3-6	5 7/8	0	0.0	D SCIENTIFIC COMPUTERS	1-6	5 3/8	-1/4	-4.4	N STORAGE TECHNOLOGY	10-39	37 1/2	-1 1/2	-3.8
C BODINE COMPUTER CORP	8-18	16 7/8	-1 3/8	-7.5	D TYMSHARE INC	14-27	24 1/4	-2 5/8	-9.7	D T RAR INC	7-19	13 1/4	-2 1/2	-15.8
D COMUSCON INC	9-17	14 3/4	-1/2	-3.2	A URS SYSTEMS	4-7	6 1/4	-1/8	-1.9	D TALLY CORP.	4-9	8 1/8	-5/8	-7.1
A COMUSCORP GROUP CORP	1-3	7/8	0	0.0	N WYLY CORP	1-5	5	-1/4	-4.7	A TEC INC	6-10	8	+1/8	+1.5
A COMPUTER INVSTRS GRP	1-2	1	+1/8	+14.2						N TEKTRONIX INC	29-44	41 1/2	-2 1/2	-5.6
M DATA-TRIC PENTAL	0-2	1 5/8	+1/4	+18.1						N TEFLEX	2-6	5 7/8	-1/8	-2.0
A DCL INC	1-4	3 3/4	-1/4	-6.2						D TESDATA SYSTEMS CP	13-20	17	-2	-10.5
N DPE INC	6-12	11 1/8	-1/2	-4.3						D WILTEK INC	1-1	5/8	0	0.0
N ITFL	13-27	24 7/8	-1 7/8	-7.0						SUPPLIES & ACCESSORIES				
N LEASCO CORP	19-34	32 3/8	-1/4	-0.7	N ADDRESSOGRAPH-MULT	10-24	21 5/8	-2 1/4	-9.4	A AMERICAN BUS PRODS	6-9	8 3/8	-7/8	-9.4
D LEASCAP CORP	1-2	1 7/8	0	0.0	D ADVANCED MEMORY SYS	7-14	12 5/8	-1 3/4	-12.1	D BALTIMORE BUS FORMS	1-4	3 1/4	-1/4	-7.1
A PIONEER TEX CORP	5-11	6 1/2	+3/4	+13.0	N AMPLEX CORP	8-16	14 3/4	-1/2	-3.2	A HARRY WRIGHT	10-27	25 5/8	+7/8	+3.5
N U.S. LEASING	10-16	15	-1/4	-1.6	D ANDERSON JACOBSON	3-8	7 1/2	+1/4	+3.4	C CYBERNETICS INC	1-1	1 1/8	+1/8	+12.5
PERIPHERALS & SUBSYSTEMS														
D ALCOMP INC	3-9	8 1/4	-1/8	-1.4	N APPLIED DIG DATA SYS	10-20	16 5/8	+1/2	+3.1	D DUPLEX PRODUCTS INC	14-25	24 3/8	-5/8	-2.5
D CAMPBELL MEMORIES	1-6	5 1/2	-5/8	-10.2	C BEHNE INT'L	5-12	5 3/4	-1/8	-2.1	N ENNIS BUS. FORMS	6-16	15 1/4	+1/2	+3.3
N CENTRONICS DATA COMP	16-30	24 3/4	-5/8	-2.4	A BOLT, REPAK & NEW	6-10	8	-1 3/8	-14.6	N 3M COMPANY	43-56	53 3/4	-1 5/8	-2.9
C COGNITRONICS	1-2	1 3/4	+1/2	+40.0	N BUNKER-PANIC	8-17	17	+1/4	+1.4	D MICRO CORP LTD	24-37	32 1/4	0	0.0
D COMPUTER COMMUN.	5-10	8 7/8	-3/4	-7.7	A CALCOMP	3-9	8 1/4	-1/8	-1.4	N NASHUA CORP	16-31	27 7/8	-3	-9.7
C COMPUTER CONSOLES	4-7	7 1/4	+3/4	+11.5	D CAMPBIDGE MEMORIES	1-6	5 1/2	-5/8	-10.2	D STANDARD REGISTER	18-26	24 3/4	0	0.0
A COMPUTER EQUIPMENT	2-6	5 3/8	+3/8	+7.5	N CENTRONICS DATA COMP	16-30	24 3/4	-5/8	-2.4	D TAR PRODUCTS CO	8-19	10 1/2	-1/8	-1.1
C COMPUTER TRANSCIVER	1-1	1 3/8	0	0.0	C COGNITRONICS	1-2	1 3/4	+1/2	+40.0	N UARCO	18-27	24 7/8	-2	-7.4
C CENTIN	9-24	23 1/4	+3 1/4	+16.2	D COMPUTER COMMUN.	5-10	8 7/8	-3/4	-7.7	A WADASH MAGNETICS	10-15	13 1/2	0	0.0
N CONRAC CORP	19-28	23 3/4	-1 1/4	-5.0	C COMPUTER CONSOLES	4-7	7 1/4	+3/4	+11.5	N WALLACE BUS FORMS	17-24	23 1/8	-1/4	-1.0
EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER G-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID (1) TO NEAREST DOLLAR														

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